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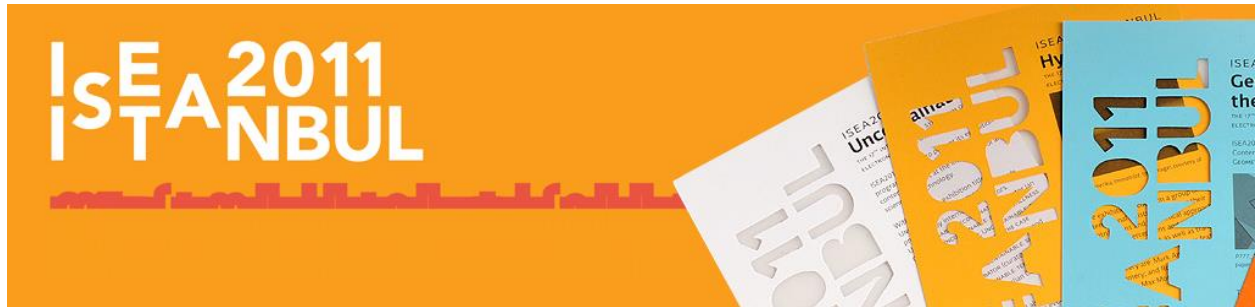
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PARTIALLY BURIED UNIVERSITY

Karen O'Rourke

Robert Smithson realized one of his first works of Land Art at Kent, Ohio in January 1970. *Partially Buried Woodshed* (1970) was an example of the process he called "entropy made visible". At the time, Smithson said he had always wanted to bury a building. For my part, I have always wanted to unearth a Smithson.

Fig 1. Partially Buried University, 3D interactive application, 2010. Karen O'Rourke, production: CITU.

Fig 2. Partially Buried University, 3D interactive application, 2010. Karen O'Rourke, production: CITU.

Fig 3. Fig. 1. Site of Robert Smithson's Partially Buried Woodshed (1970), photograph: Karen O'Rourke (2005).

Robert Smithson realized one of his first works of Land Art at Kent, Ohio in January 1970. *Partially Buried Woodshed* (1970) was an example of the process he called entropy. At the time, Smithson said he had always wanted to bury a building. For my part, I have always wanted to unearth a Smithson.

The Centre Saint Charles has a problem with rain water collecting on the roof and infiltrating the lecture hall just below. Inspired by two of Smithson's projects, "Partially Buried University" involves creating a garden on the roof terrace to absorb the residual water, reduce our carbon footprint and contribute to sustainable development. Since the roof was never intended to support the weight of growing trees and shrubs, it is likely that at some point it will collapse. The garden may then develop on its own, with weeds springing up throughout the building.

A 3-D model of the roof was built, simulating weather conditions and plant growth, thanks to models developed by engineers and scientists at the ECP-INRIA.(i) The visitor stands in front of a 3-D VR projection of the building, on the second floor overlooking the roof which has been made into a garden. She chooses a seed, putting it in a basket, then moves through the garden to plant it. After a number of people have sown poplars, cypresses, pines, maples and chestnut trees, the garden grows quickly, the roof just may give way and visitors suddenly find themselves climbing over rubble in the lecture hall below.

I will document the creation of *Partially Buried University* from preliminary research on Smithson's conception of entropy, and the public reception of one of his earthworks, to the realization involving artists, scientists and developers.(ii)

Partially Buried Woodshed

On January 22, 1970, Robert Smithson "partially buried" a woodshed by having twenty backhoe loads of soil dumped on it until the central beam cracked. Usually artists and theoreticians are concerned with the genesis of the art work. How did it come into being? From his interest in entropy and what he called "the dialectical landscape", Robert Smithson focused on process, the long-term and medium-term evolution of sites before and after the artist's intervention.

Smithson had been invited to spend a week as artist-in-residence at Kent State University by the organizers of the Creative Arts Festival. Self-taught, well known in avant-garde circles, shown in Europe ("When attitudes become form", 1969), published in *Artforum* and *Arts Magazine*, he had begun to realize his first earthworks in brownfield sites. On the Kent campus, he intended to pour mud down a slope as he had done with asphalt a few months earlier in Rome. Yet that winter in northern Ohio the ground was frozen solid: there was no way he could pour anything. Suffering from the flu, the artist was ready to return to New York. The students gathered around him at Professor Brinsley Tyrrell's house were not willing to see him go so soon: What else could he do? Upon reflection, he mentioned the idea of burying a building.(iii)

In an old farm the university had just bought at the far edge of campus, one of the students spotted an abandoned woodshed, filled with dirt, gravel and firewood. While the artist made sketches, the teacher and the students spent the day carting away most of the wood. A local contractor was hired to move twenty bucketloads of earth from another site on campus and pile them on the shed. According to a witness, "the earth was put on scoop by scoop, like applying paint with a brush".(iv) When the center beam cracked, the work was completed: it announced the beginning of the process of entropy. Smithson took snapshots with an instamatic camera. The local newspaper ran the headline "It's a Mud Mud Mud World".(v)

Partially Buried Woodshed was one of his first works on a large scale in the landscape. On January 22 he wrote a deed, giving the structure a title and a monetary value (it was Dwan, the artist's New York gallery, who came up with the price). He donated it to the university to prevent it from being bulldozed. "It was given a $10.000 value because if we were going to try to preserve this thing, then we could argue money," said Brinsley Tyrrell, "The money thing was all a game...to convey its importance to people to whom you couldn't talk about aesthetics."(vi)
Thus began the slow decline of the woodshed, which gradually lost its logs, roof, walls, as the work was gaining notoriety. Estimated at ten thousand dollars at the time of its completion, it was worth two hundred and fifty thousand dollars at its demise fourteen years later. Today the object itself no longer exists, while the work has become legendary. Its bibliography contains dozens of titles.

In April Smithson was in Utah to build *Spiral Jetty* at Rozel Point on the shores of the Great Salt Lake. At about the same time, Kent State University was the scene of protest against the American invasion of Cambodia. The Ohio National Guard was called in. On May 4, guardsmen opened fire on demonstrators, killing four students and wounding nine others. The campus was evacuated, twenty-five students arrested. Some time after the university was closed, on the lintel of the shed appeared a graffiti painted in large white letters: "May 4 Kent 70". As Nancy Holt remarked later, "the students obviously recognized the parallel. Piling the earth until the central beam cracked, as though...the whole country were cracking. It was the end of one society and the beginning of the next." (vii). It certainly divided Americans into

two camps, the peaceniks and the war mongers. Kent State was thought by many to be the last great nationwide protest, the swan song of sixties' era student revolts, paving the way for Ronald Reagan's "conservative revolution" ten years later.

On July 20, 1973 Smithson was killed in a plane crash in Texas while preparing his project *Amarillo Ramp*. Although he had specified when he made the work that he wanted it to be allowed "to go back to the land", his widow, Nancy Holt, considered it an important work and petitioned for it to be preserved, and maintained.

In the years following the killings, Kent State's reputation was tarnished. Eager to attract students and alumni donors, the University administration invested in sports facilities. Oblivious of the work's growing importance, Kent State President Glenn Oldsasked the university architect to prepare a project for enhancing the campus which would involve the demolition of the woodshed. It now stood near the new entrance to campus, on the way to the football field. To make matters worse, in March, 1975 during spring break, an arsonist set fire to the shed. The left side was destroyed, while the right side, where the earth had been piled up, was spared. This gave university officials added reason to demolish the entire structure: it was not the original, they argued, it was dangerous (visitors could be injured by the debris), it was ugly. A group of art professors objected. In the contemporary art world, *Partially Buried Woodshed* had become an object of pilgrimage: visitors came from afar to admire one of the earliest works of "Land Art". The University Arts Commission voted to preserve the work. After much negotiation, a compromise was reached: the shed remained, but the gardeners who maintained the campus were allowed to cart off debris that fell on the ground. Later the university would plant a grove of conifers around it, a barricade meant to hide the view of the "eyesore" from the road.

Visiting Kent State in 2003 I was struck by the beauty of the spot where Smithson had caused a chain of events nobody could have foreseen.[fig. 1] The process contines even today. Nancy Holt believes that it is characteristic of works of art to provoke a cascade of effects: "Works of art tend to be focal points and centers of energy that other people spin off of, and that's because works of art have no other reason for existence. They are not there for any functional reason: so they get right to the heart of things."(viii). For some today (like Dorothy Shinn), Smithson's work continues to live its life, while others, including Brinsley Tyrrell, believe that beyond a certain point the art work no longer exists: for them the site is a ruin with only archaeological value.

Partially Buried University

At first sight *Partially Buried University* (fig. 2] has little in common with its namesake. It was designed in the framework of the project Terra Numerica which developed "new tools to model the 3D city and explore new forms of urban representation". Whereas the Smithson work was experimental, more or less improvised to fit the situation, my project was more of a top-down, highly planned affair that took two years to conceive and several months to model. Smithson was inventing an art form he called "earthworks", I was interested in imagining artistic uses for technologies developed for the military and industry.

The concept of "competitive cluster" (pôles de compétitivité) is part of an industrial policy launched by the French Interministerial Committee for Planning and Development (CIADT) in 2004 to increase

France's capacity for innovation. It aims to foster an active partnership between industry, research centers and training organizations from both the public and private sectors in a strategy "designed to create synergies around innovative projects conducted jointly in the perspective of one or more markets." Led byThalès, Terra Numerica mobilized seventeen partner organizations (all members of the cluster Cap Digital) for four years to represent the large urban areas: "urban heritage in 3D for the benefit of sustainable cities."

The context is that of a large, "top down" project driven and supported by the governmental bodies to increase the attractiveness and visibility of France in the field of information technology and communication. As a member of Cap Digital, the CITU laboratory focused on scenarios using augmented reality and virtual reality. A 3D application was produced by the CITU with the help of partners at the ECP-INRIA.

In my scenario, the visitor stands on the first floor of the Centre Saint Charles. She can move around the area on the terrace set aside for the garden, visit the rooms and corridors that overlook the terrace, move down one floor to the lecture hall, move up to classrooms on the higher floors. At the entrance to the terrace, a shelf contains several varieties of seeds for her to plant. After choosing one, she must move around to place the plant where it will begin to grow. As the number and size of the plants increase, the terrace becomes fragile and collapses into the lecture hall below.

For Smithson, entropy meant not only the deterioriation of order, but more importantly, "the clash of uncoordinated orders".(vii) He told an interviewer "entropy contradicts the usual notion of a mechanistic world view. In other words it's a condition that's irreversible, it's a condition that's moving towards a gradual equilibrium.... Perhaps a nice succinct definition of entropy would be Humpty Dumpty. Like Humpty Dumpty sat on a wall, Humpty Dumpty had a great fall, all the king's horses and all the king's men couldn't put Humpty Dumpty back together again."(x)

Yet the action of entropy over time is contradicted by other processes. "Scientists have long been baffled by the existence of spontaneous order in the universe." writes mathematician Steven Strogatz. "The laws of thermodynamics seem to dictate the opposite, that nature should inexorably degenerate toward a state of greater disorder, greater entropy. Yet all around us we see magnificent structures -- galaxies, cells, ecosystems, human beings -- that have somehow managed to assemble themselves. This enigma bedevils all of science today. Only in a few situations do we have a clear understanding of how order arises on its own."(xi)

In *Partially Buried University* the viewer can see a projection in time (accelerated): the evolution of the garden, the collapse of the terrace, the invasion of the biosphere. The whole process has been greatly simplified, but users can continue to plant trees even after the collapse. The idea of collectively maintaining a garden on the terrace above the lecture hall to absorb the excess water could provide a functional solution to an architectural problem. The process creates a tension that must be taken into account, to ensure perhaps that the garden does not collapse. I would like to maintain the tension between the work of "entropy", the possible collapse of the roof, which would disrupt the course of events, as breaking the center beam of the woodshed did in Kent, and the agency of users (humans or plants) who might take advantage of the breach to build something new. As Smithson's work seemed to symbolically represent the rift in American culture of the seventies, so *Partially Buried University* could also refer obliquely to the French university strike in the spring of 2009.

I would like the final work to maintain this tension. What do we want to do after all? Plant a garden? Bury a university? And if being "ecologically correct" meant cutting off the branch on which we are seated? Others may argue that the "invasion" of the Centre Saint Charles by "weeds" ("vagabonds" as

Gilles Clément calls them) is the best-case scenario. In ecology, entropy is a measure of biodiversity. By introducing plants "foreign" to the terrace, we could contribute to this diversity.

The project should reveal the dramatic tension between entropy and organization, between the act of an artist "demiurge" and the inhabitants of the Centre who live with the consequences. They may want the artwork to be removed (and the roof rebuilt), but they might also take advantage of its action to create something else. This is not necessarily in the lecture hall, as I suggest in the prototype, but if the roof (or part of the roof) collapses, that's where we fall. The result does not depend entirely on the growth of vegetation, human users could develop improvised architectures, transform the lecture hall into a duplex, add a spiral staircase, a skylight.

References and Notes:

i Digiplante : Mathematical Modelling of Plant Growth http://digiplante.saclay.inria.fr/

ii. "Partially Buried Unversity" was produced by the CITU (Universités Paris 1 - Paris 8) as part of the TerraNumerica Program. Software development by Jordan Prot. The plant growth models courtesy of ECP-INRIA. The project would not have been possible without the energy and talent of the entire Citu team.

iii. Dorothy Shinn, Robert Smithson's Partially Buried Woodshed, Kent State University School of Art, 1990.

iv. Robert Swick, quoted by William Bierman, "Spare the Woodshed! Burn the Woodshed!", Akron Beacon-Journal, July 20, 1975.

V. A derogative allusion to a popular 1963 film, It's a Mad Mad Mad World. as Smithson notes in "Entropy Made Visible", Interview with Alison Sky, On Site N°4, 1973, in Jack Flam, Ed., Robert Smithson, the Collected Writings, University of California Press, 1996:307.

vi. Brinsley Tyrrell quoted by Dorothy Shinn: 4.

vii. Nancy Holt, quoted by Dorothy Shinn: 5.

viii.Nancy Holt, ibid: 16, n. 19.

ix.Lawrence Alloway, "Robert Smithson's Development", Artforum, November 1972: 53-61.

x. Robert Smithson, "Entropy Made Visible".

xi. Steven Strogatz, Sync: How Order Emerges From Chaos In the Universe, Nature, and Daily Life, New York: Hyperion, 2003

LUDIC LISTENING: SOUND ART IN VIDEO GAME DESIGN

Aaron Oldenburg

This paper will briefly discuss the history of sonic experimentation in digital game design, and describe one of a series of games the author is in the process of creating that directly address ideas in sound art theory. These projects focus on the world of audio with the intention of distancing video games from the rational and concrete. Video games in turn facilitate the exploration of relatively new paths in sound art.

This paper describes several experiments in audio-based game design that attempt to expand the expressive vocabulary of games, briefly discussing the histories and theories of sound art and video game design while outlining their potential to merge. These experiments probe what appears to be under-explored territory in audio games: although music-based play has been popular for some time, dating as far back as Mozart's musical dice game, [3] other forms of sound are relatively under-explored as the basis of game mechanics. This paper assesses the history of audio-based digital games, particularly the genre of music games, examining their limitations while drawing attention to areas of current and future experimentation. The author is in the process of creating a series of short games that explore new forms of audio-based game design, and will discuss one that involves voice-activated visual echolocation in an evasive three-dimensional sonic landscape.

The majority of audio-based digital games are musical and are comprised of the following two major categories: those that build gameplay around pre-existing musical compositions and those that generate dynamic music as a result of player action. In many music video games, the challenge that players face is to hit specific buttons in time with the beat of pre-recorded music. By contrast, the shooting game Rez allows players to compose music indirectly, by playing notes that are generated by the player's firing pattern. [5] Much interactive music software falls outside of games and into the more general category of "toys," as they have no set goals or obstacles. Often the player's only given objective is to compose music through experiment and play. Game or interactive toy-based generative compositions are not without constraints, however, as designers often restrict players to a certain set of notes to prevent them from creating music that is too dissonant and in some cases even alter the player's feedback to fit a pre-conceived rhythm.

Broader definitions of music, such as those proposed by John Cage, have not been widely explored in music-based digital games. Independent and experimental game designers, however, have explored other forms of sound-based game design. Eddo Stern's "Darkgame" installation relies on visual sensory deprivation, focusing in part on the side-effect of heightening other senses such as hearing. In experimental game design competitions, it is a popular challenge to create non-visual gameplay that requires the player to navigate by sound. Although three-dimensional first-person shooters have always relied on audio cues to alert players to the offscreen presence of enemies, the aforementioned games explore new ways to use audio as a way to augment or replace visual navigation.

Sonic art theorist Seth Kim-Cohen argues for a conceptual sound art that is not based on what is heard, "but in the elsewhere/elsewhen engagement with ideas, conventions and preoccupations." [4] Just as

the visual arts have explored the verbal and written communication of ideas over the retinal, he believes that sonic arts can move beyond the sensory. "Hear, Hear," an artwork created by Papermen at Eyebeam, New York, in 2011, is a silent kinetic sculptural representation of the collecting of vibrations by the ear and processing by the brain. It is a silently moving sculpture that nonetheless sparks a cognitive engagement with the processes of hearing. Are there ways that games can represent sound without reproducing it? Games are simulations, or, as Salen & Zimmerman put it, "procedural representations of reality." [6] It is interesting to note that most representations in game worlds, whether they be of death, conflict, conversation, are all simulated, yet sound is almost always reproduced (like visuals). An important area to explore, it would seem, would be simulation of sound through gameplay: having the player perform actions that are representative of the physical and cognitive aspects of hearing, listening and sounding.

What aspects of audio hold potential for game-based simulation? Consider the following descriptions of sounds in the context of actions, environments and visual representations in video games. David Toop compares sound's properties to those of "perfume or smoke," stating that "sound's boundaries lack clarity, spreading in the air as they do or arriving from hidden places." [7] He points out that sound "implies some degree of insubstantiality and uncertainty, some potential for illusion or deception, some ambiguity of absence or presence," and that, "Through sound, the boundaries of the physical world are questioned, even threatened or undone by instability." [7] Sound also has the "ability to stretch across the cut, to meld continuously from one 'object' or entity to another." [2] Sound always arrives at our ears blended, like shadows. [1] Typical games, by contrast, are often about the manipulation of distinct objects with logical boundaries. Games are often, however, about discovering alternate universes, and so contain the potential to allow players to explore worlds with fluid boundaries and objects that blend or arrive with ambiguous origins, like sound.

Optic Echo is a game created for mobile devices with the intention of representing visuals as sound is heard. Walls in the 3D environment are represented not as solid points in space but as particles flying toward the player "from hidden places." Visualization of the player's environment and non-player characters is migratory, ephemeral, like sound. Gameplay references echolocation: the player makes a constant noise (for example, with his or her voice) into the microphone and the game uses the volume of this sound to visually render the walls of the 3D environment, as if the particles were noise echoing off of the walls. The location of solid objects, like the origin of sound, must be inferred from the "optic echo's" movement. The manner in which the visuals were created to resemble sound was inspired by a quote from Frances Dyson in Sounding New Media:

like the fire, sound is always coming into and going out of existence, evading the continuous presence that metaphysics requires; like the fire also, sound is heard and felt simultaneously, dissolving subject and object, interior and exterior. Like the river, sound cannot be called 'the same' since it changes at every point in its movement through a space; yet like 'Soul,' it does not strictly belong to the object. Nor can sound's source and ending be defined. [1]

This was an attempt to mimic audio through another sense, a step toward simulating audio through gameplay.

Humans cognitively approach sound in ways that we do not engage with our other senses. Could it be that in games, navigating a 3D spatial tactile world is not the best way to move? How about forward and backward through the time of a sound? What choices could the player make as they move, what obstacles overcome? Studying audio gives game designers new ways to construct (and deconstruct)

space and action. Conversely, the 3D spatio-centric worlds of video games give artists who work with audio a space where they can explore goal and conflict-based compositional techniques, giving their audiences the potential to engage and procedurally explore the processes of hearing and listening.

_References and Note_s:

1. Frances Dyson, Sounding New Media : Immersion and Embodiment in the Arts and Culture (Berkeley, CA: University of California Press, 2009), 121.
2. Douglas Kahn, Noise, Water, Meat: A History of Sound in the Arts (Cambridge, MA: The MIT Press, 2001), 148.
3. Fares Kayali and Martin Pichlmair, "Levels of Sound: On the Principles of Interactivity in Music Video Games," Proceedings of DiGRA 2007 Conference,Tokyo, 2007, http://www.digra.org/dl/db/07311.14286.pdf (accessed June 11, 2012).
4. Seth Kim-Cohen, In the Blink of an Ear : Toward a Non-cochlear Sonic Art(New York: Continuum, 2009), 37.
5. Rez (video game) is designed and produced by Tetsuya Mizuguchi and directed by Jun Kobayashi (2002).
6. Katie Salen and Eric Zimmerman, Rules of Play: Game Design Fundamentals(Cambridge, MA: The MIT Press, 2003), 457.
7. David Toop, Sinister Resonance: The Mediumship of the Listener (New York: Continuum, 2010), 24, 36.

BODIES, INTERACTIVITY AND TECHNICITY IN MEDIA ART

ANDREIA OLIVEIRA

This paper addresses the *degrees of interactivity* produced with and within an artwork. The act of experiencing an artwork shows that any experience is made up of relations of intensity within processes of interactivity between bodies and milieus. These ideas are based on the philosophical writings of Baruch Spinoza, Gilbert Simondon and Gilles Deleuze and are applied to the field of interactive art.

Introduction

This writing is inspired by Spinoza's question—*What can a body do?*—and by his answer—*we never know what a body can do*—until the encounter, and then, what it *can* do depends on the intensity of the encounter and the body's capacity of affecting and being affected. Spinoza's question is the foundation of this paper and it will be concurrently problematized in three different fields of knowledge: Arts, Philosophy, and Psychology. Also, we avoid paradoxical extremes, e.g. natural and artificial, art and life, analog and digital, human and technological, real and virtual, etc which can be reconciled by creating paradigms that propose novel conceptions of what constitutes bodies, environments, artworks and technology.

It begins by asking the question *What can a body do?* and proceeds to ask *How much can a body do?* in the encounter, in our case, with an artwork. In this encounter with the artwork, the relations of affects and affections between the artwork/artist's/spectator's bodies and the milieu happen as an interactive process. Any experience implies interactivity but our interest lies in how this interactivity happens: What are its modes of production? How are bodies themselves affected? What are the nuances of such experience? Thus, our aim is to investigate the ontology of experiencing the artwork, or better yet, in the artwork with its processes of interactivity, herein referred to as *degrees of interactivity.* [1] The artworks as outcomes of a processual and systemic thought which does not dissociate the artwork-human-milieu, and directed to the intensities of the encounter. So, the question *How much can the body do?* in the encounter with the artwork is posed in terms of *degrees of interactivity* between bodies and milieus associated in intensive experience.

The body referred to here includes not only the human but the non-human as well—animal, technological, immaterial—formed by the speed or slowness of matter-taking-form. According to Spinoza, "we have conceived an individual as composed of several individuals of diverse natures, other in respect of motion and rest, speed and slowness". [2] To imagine the body differently we will need to cast off anthropocentric and transcendental positions and consider its spatial extension, potentials, intensities and movement in new ways. The question of the body will be examined from a Spinozist perspective based on the idea of parallelism between body and soul and the concept of the intensive immanent body; from Deleuze and Guatarri we will use the concept of the body without organs; and from Simondon the information body.

The body formed by a technology—thinking, walking, seeing, typing—its nature is essentially artificial. A body is not dualistic as it integrates dichotomies: it is analogue and digital, human and machinic, natural and artificial, perceptive and imperceptive, body and soul, matter and form. It must be stressed that the

body as matter-taking-form only exists in the presence of other bodies and belongs to the associated milieu by which it was created and within which it was created. Artwork, human, animal, machine, landscape, idea-body... bodies of flesh, blood, computer chips, images, sounds, waves, frequencies, affects, signs... bodies not bounded by skin, canvas, walls, or screens... extensive bodies in milieus where they become associated as intensive relations.

Thus, bodies are always in relation with each other, associated to the milieu to which they belong. This paper emerges from concerns and observations about how the artwork is constituted: the artwork belongs to the associated milieu; the artwork is a techno-aesthetic object produced by technology and its entrained technicities; and the artwork can only be understood through the artwork-human-milieu system.

Associeted Milieu

In this sense, we propose a relational perceptual causal chain that underlies a machinic experiential interpretation of the interactive process where viewers become one with the artwork in the experiential milieu that will come to be seen as the exhibition spacetime.[3] We seek to consider the experiential milieu itself as the conditioning environment for the subjective entity that constitutes the event and locate it at the junction of the site of exhibition and the viewer function where the virtual and the actual coincide and become pure experience. In order to do that what we need is not a perceptual causal chain per se but a remapping of the experiential milieu where viewers become one with the artwork-world within which they are enveloped.

The milieu is normally understood as the ensemble of external conditions within which a living being lives and develops or as the assemblage of material objects and physical circumstances which surround and influence an organism. Conceptually, "milieu" can also be seen as an environment in the widest ecological sense of the term, i.e. as the locus of the dynamic interaction of all the factors and mechanisms that participate in the sustenance of an ecosystem.

The concept of the associated milieu, conceived by French philosopher Gilbert Simondon in his book *Du mode d'existence des objets techniques* (1989), is a useful model to analyze the co-arising relationships that take place between an artwork and its conditioning environment. The descriptive term "associated" when applied to describe milieu refers to a specific mapping of an ensemble made up of constitutive elements (which can be sub-ensembles) and conditioning environmental modalities which come together to create a concretized individuation through the ongoing exchanges of energy that take place within that specific milieu. [4]

The milieu allows for a reciprocal relational causality to take place between the elements so that we may conceive of spacetime as the immanent plane from which the subject and object arise. The associated milieu sustains, unites and brings together bodies: it is not a stage upon which a scene unfolds, or a play where only the actors perform, or a canvas upon which the pigments run into each other, or a manuscript where the words follow each other in sequence. The milieu is the setting and environment of concretion, of aggregation, where things condition each other in order to form something which in turn, simultaneously, allows these very same things to take form themselves. In other words, the milieu allows for a non-static, dynamic form as an event of taking-form as experience.

The milieu crosses through bodies, simultaneously existing within the body and outside of it like the air which one breathes, or the water that permeates our body, or the earth that nurtures and nourishes us. To think of the milieu is to think of the production of the body proper, its modes of functioning, and its pre-established connections and relations. In this way, the milieu is active and defines itself as a source of energies, perceptions and actions.

From these preliminary ideas about milieu, it appears that the artwork is produced from the relations between bodies and milieus, mediated by *technologies of creation* and their technicities*, where relations are expressed as variable intensities of interactivity, i.e. as *degrees of interactivity.* These degrees are nuances of the act of experiencing: mixtures, attractions, embodiments and perceptions. Various and concurrent movements, mixing within the milieu, attracting each other, incorporating fragments of bodies, perceiving (themselves) as body and associated milieu as ephemeral landscapes.

Degrees of Interactivity

Mixtures are inevitable; they are voluntary and involuntary affections between bodies and associated milieus; hybrid bodies belonging to the milieu and keen to experience themselves in different ways. To understand the pragmatics of bodies, it is imperative that we understand the immanent relations of bodies. Plato's, Spinoza's, Deleuze's and Simondon's ideas of immanence produce differentiated bodies. In Plato and Aristotle, the transcendent and immanent planes oppose each other, as do body and soul, where the supremacy of the soul prevails. Spinoza brings together transcendence and immanence, as well as body and soul, as parallel relations. The relations between bodies and milieus are immanent and intensive, bodies and souls being relations of speed and slowness. We are equal in terms of attributes, and singular in terms of modes of existence.

Their Ethics are based on what a body is capable of doing, and the positive encounters which potentialize it. In Simondon and Deleuze, bodies and milieus mutually adapt to and create each other in the act of experiencing. Bodies, as relations/gestures of individuation, are no longer subordinate to Aristotelian substance mentioned earlier; being, as the union of the individual and the milieu, is no longer Spinoza's Divine Being; mixtures address the interdependent relations between bodies and milieus. They are mundane signs inhabiting mixtures. These paradoxal mundane signs can lead us to intensive relations with the milieu, exposing bodies to contagion; or they can leave us with empty action-reactions, abandoning the body to suffer the effects without knowing the causes.

Attractions move bodies. Bodies touch each other through the associated milieu where they come together complicitly. Desire expands bodies throughout the milieu, and keeps them connected. We are dealing with an animal art that shows us the potential of the milieu and the affects bodies resulting from the animal behavior of feeling the vibrations of other bodies of through the associated milieu. "All art begins with the animal, for it is the animal, and not machines, minds, or subjects, that carve territories and bodies simultaneously: minds, machines, subjects are themselves the artistic products of this coupling of bodies and milieus". [5] Animals can only catch their prey when part of their body and part of their prey are mixed. When part of the artwork is already part of the spectator's body, we enter the artwork with one body and leave it with another one. Animal-becomings make us discover non-human bodies.

We fall back on affects of relations, where the agent-causes of other bodies on our own are known, where affects are felt as variations of the force of existence of the soul and of the potential of the body

to act. "For, in proportion as the body is capable of being affected in a greater variety of ways, and of affecting external bodies in a great number of ways, so much the more is the mind capable of thinking". [6] In the attractions, it is understood that bodies produce affects—Art being a block of affects and percepts. [7] When attracted, one is captured by the amorous signs that deceive and create fictions, either making us prisoners of the illusions of representation, searching for origins and truths, or releasing us to confabulations, lies and invented realities.

Embodiments are visceral once we give body to that which is lived. Causes are not only known, but also created; propositions, objects, experiences are produced by means of technologies. The act of embodying life is technological, in that what is natural is effected by the artificial. Appropriate technologies are needed to give form, or better yet, for matter-taking-form. Artists use/invent technologies to compose the elements affecting them in order to arrive at the technicities of the artwork.

In this sense, Simondon rescues the relation between man and technics by re-defining human existence in terms of the technical reality that surrounds it. Simondon developed the concept of technicity in terms of open machines and conceived new environments for their unfolding in terms of the associated milieu which allows the inter-dependent co-arising of the technical object, creator and environment into an event.

Through the techno-aesthetic object, art liberates technics and techniques from their technological and cultural contexts in order to surpass their initial function and purpose as well as promote other ways of feeling and thinking. It must be emphasized that this direction consists of a political and ethical position (and not a moral stance) that provides us with the means of thinking our existence in terms of the technical reality that surrounds us.

Technicities belong to bodies; they are the expressive qualities that arise from the composition and organizations of their elements as individual ways of composing: the singing of a bird, the coloration of a plant, the functionality of a machine, the expressiveness of an artwork, the gestures of a dancer... Technicities move within the technical and aesthetic dimensions of techno-aesthetic objects, centering us on that which happens within matter and form. "Matter is thus defined in terms of a *form-taking activity* immanent to the event of taking-form." [8]

Each element draws out implicit forms which are manifested in the techno-aesthetic operations which also determines them. The aim is to understand that which is produced in the experience, in the artwork, artist, spectator, art gallery—with its materials, elements and implicit forms. From sensuous signs, we embody that which tells us about the material qualities and guides us to the immaterial in Art. Signs bring on degrees of interactivity which create information that disrupts the artwork-human-milieu system while internal resonances are produced. Thus, tendencies and attractions become embodiments.

(Im)perceptions are landscapes of creations/actions to be lived. They are actions resulting from embodiments, i.e. they are the effects of mixtures, attractions and embodiments. In order for us to live, we need landscapes to shelter our bodies and souls. Art goes beyond explaining the creation of ephemeral landscapes, it brings us to create unusual landscapes. The singularity of landscapes consists of making visible that which is invisible and allows us to arrive at the imperceptible in perception, the immaterial in the material, the technicities in technologies. It must be stressed that the body perceives before the soul can contemplate; the body perceives not only with the sense organs but also with the affects which inhabit it. Perceptions take place between the perceiver and that which is perceived by means of dynamic forms. "Art brings back out the fact that all form is necessarily *dynamic form*". [9] For this reason, the

artwork can only be understood through the intrinsic and extrinsic dynamics of the meta-stable system of the artwork-human-milieu. This system encompasses an internal resonance herein understood as interactivity. Because the system is meta-stable, it is subject to the problematizing caused by information, which triggers new individuations. [10]

The function of Art is to produce information, to cause alienations so that landscape-simulacra can arise. Landscapes are created through the oscillation between panoramas—prisoners of false impressions and mimetic representations—and simulacra formed in the encounter of dissimilarities in order to produce invented realities: invention is the highest degree of interactivity. Signs in Art give access to the information that produces phase changes in the artwork-human-milieu system: the sign in Art is not the perfection of the sign. It is paradoxal as any other—it closes up when it falls apart in the dissolution of the form, where it can reach the extremes of schizophrenic landscapes; it opens up when absorbing the immaterial dimension of life though the perception in the perception, where landscapes full of different signs are created.

Conclusion

Mixtures in mundane signs, attractions in amorous signs, embodiments in sensuous signs, perceptions in signs in Art: [11] *degrees of interactivity* of an experience. For an experience to be intensive, the sign must remain open to its dynamic and associative processes as it is not a particular sign or element but the associations of signs and elements which move through all *degrees of interactivity*. In this sense, the problem the paper considers is the dynamics of *degrees of interactivity* in the experience of bodies—artwork, artist/spectator, machine, ideas—and their associated milieus, or better, the process of interactivity in art.

We seek to problematize questions of interactivity in order to open pathways to think the techno-aesthetic art object in terms of real interactivity and not simply responsiveness: What constitutes interactivity? What is the role of the spectator/participant? What is the role of technology as the mediating agent? What kind of bodies, milieus, space-times result from the interactive techno-aesthetic object? What are the ontological implications of these techno-aesthetic considerations? How may we think of interactivity in the humanities through art experience?

When researching interactivity in the Arts, it is inevitable not to take the problem to the field of interactive art. Interactive artworks take place and are modified during the artist/spectator/artwork/milieu experience; as they are fundamentally relational, they break down the frame and require participation. Their immaterial potential will be realized in the relational mode in which they operate by acting as a mechanical translator of content and representations, or as a machinic transducer of information. "We understand transduction to be a physical, biological, mental, and social process through which and activity is propagated from individual to individual within a domain." [12] By being an art of action, interactive art can instantly produce action-reactions, or the action can be the effectiveness of the techno-aesthetic operation of the artwork itself as performed by the spectators, in other words, an artwork keeps its operation open in order to allow the spectator to access its implicit forms. Interactive art presents possibilities to explain the processuality of *technologies of creation*.

Technology has its own specific modes of producing bodies which go beyond those which participate in interactive processes. In this sense, when interactivity is produced within techno-aesthetic objects, the compositional relations create novel modes of expression of what a body is and what it can

do. Therefore, the questions become: what is possible (or not) within this construction of bodies and milieus in interactive art? Where is the ethical limit which guides such productions? How much can a body endure within the proposed relations?

This paper comes to the conclusion that *processes of interactivity*, especially in interactive art, address the ethics of the body's potential to act [13] in terms of *how much can a body do*? We seek answers to how an artwork can provoke "joyful" encounters which liberate the potential to act as well as *degrees of interactivity*. The artwork itself does not *per se* exist except as the aesthetic experience with and within the artwork: it exists as an individuation of the artwork-human-milieu system. Simondon's ethics propose processual thought as a constant individuation. His philosophy of technics addresses an ontogeny of human and non-human being (individual and milieu) and is not concerned first-hand with the final configuration of things but with how they become what they are. It is thought that can support interactive art and made to be modified over time as it gathers existential amplitude in its matter-taking-form process.

Promiscuous/ethical bodies are found in the art-life experience; they are promiscuous in the act of mixing amongst themselves, and ethical in their potential to act according to the dynamics of *degrees of interactivity* within each experience.

References and Notes:

1. *A. M. Oliveira, Corpos Associados: Interatividade e Tecnicidade nas Paisagens da Arte (Porto Alegre l: UFRGS, 2010).*
2. *B. Spinoza, The Ethics: The Road to Inner Freedom (New York: Philosophical Library, 1957), 191.*
3. *A. M. Oliveira and F. Rebolledo, "The Associeted Milieu: A Machinic Assemblage between Artwork and Viewer," in International Journal of the Arts in Society 5, no. 5 (2011): 217-224.*
4. *G. Simondon, Du Mode d'Existence des Objets Techniques (Paris: Editions Aubier, 1989), 57.*
5. *E. Grozs. Chaos, Territory, Art: Deleuze and the Framing of the Earth (New York: Columbia University Press, 2008), 35.*
6. *B. Spinoza, The Ethics: The Road to Inner Freedom (New York: Philosophical Library, 1957), 132.*
7. *G. Deleuze and F. Guattari, What is Philosophy? (New York: Columbia University Press, 1994).*
8. *B. Massumi, "Technical Mentality Revisited: Brian Massumi on Gilbert Simondon," in Parrhesia 7 (2009): 36-45.*
9. *B. Massumi, "The Thinking-Feeling of What Happens," in Inflexions 1 no. 1 (2008): 8.*
10. *G. Simondon, L´Individuation à la Lumière des Notions de Forme et D'Information (Millon: Éditions Jérôme Milton, 2005).*
11. *G. Deleuze, Proust e os Signos (Rio de Janeiro: Forense-Universitária, 1987).*
12. *ELEKTRA 12: International Digital Art Festival, Montréal, May 4-8, 2011.*
13. *G. Deleuze, En Medio de Spinoza (Buenos Aires: Cactus, 2008).*

NANOVIBRANCY: AN AUDITORY PERFORMANCE OF NANOSCALE RESONANCE

Joel Ong

Nanovibrancy explores nanoscale activity by amplifying the oscilations at the surface of a model tympanic membrane in real time.The project repurposes the AFM by extending its reach into the creation of abstract, subjective and ephermeral sound.It shifts the observation of the miniscule from scientific eye to artistic ear, amplifying the resonance of reality and imagination through a confluence of nano and human scale listening.

Figure 1: Screen shot of Nanovibrancy test run at the John Curtin Gallery, Perth. 2011. Image credit: Joel Ong.

Figure 2: Eardrum Man (2011). What would the eardrum sound like if we were small enough to stand on it? Image Credit: Joel Ong.

Introduction

This paper describes key concepts and processes behind Nanovibrancy, a sound performance installation that utilizes the atomic force microscope (AFM) as a listening device to record and amplify vibrations on the surface of a membrane. It rests the probe in the centre of a silk membrane that functions as a model for tympanic listening. In so doing, the AFM does not deliver a visual representation of the membrane insofar as it is tasked to provide an image of it; but more to determine its process over time and stretch the image into an evolving and ephemeral soundscape.

 The project aims to subvert the premise of visual imagery in the current climate of nano-scientific observation through audile, subjective and ephemeral data derived from the AFM scans in real time. It is also site-specific in that it creates an immersive sonic environment fusing the nano-scale resonance of vibratory matter and the human-scale acoustical environment of the gallery space.Nanovibrancy was presented as a durational performance-installation at the John Curtin Gallery in July 2011. (Figure 1)

While the AFM is still an image-creating machine (albeit through complex but arbitrary algorithms), it removes the distance required by the focusing lenses of light-based microscopes and actually contacts the sample's surface as a way to gain atomic resolution. This emphasis on touch as the operant sense for nanoscale perception therefore allows a reordering of the scientific observation strategies commonly associated with microscopy. In addition, it also offers the chance for an artistic, poetic representation of the nanoscale environment. Since the sample's vibrations are highly influenced by environmental factors like ambient noise, air flow, temperature and humidity, this process reflects a vibrancy and agency that is not only centered on the sample, but also in its dynamic position within the environment.

Sidelining Occularity

The invention of the Scanning Probe Microscope (SPM) and its offshoots the Scanning Tunneling Microscope in 1982 and the AFM in 1986 by Gerd Binnig and Heini Rohrer (Binnig and Rohrer, 1986) revealed that to image high-resolution samples at the smallest scale possible, light had become obsolete.

 While conventional optical approaches reflected light off the sample through a series of lenses, these devices worked by directly interacting with and touching its surface. The resolution possible was now beyond the effective wavelength of light, inaugurating a range of microscopes that could see into the nanoscale, but ironically were 'blind'.

 This invention of the SPM technique signaled a paradigm shift that Peter Galison (2006) refers to as replacing visual ontology with an action or intervention. In so doing, the visual output of the microscope becomes connected to this ability to contact and change, becoming sidelined as a sensory accomplice in the creation and manipulation of nanostructures. Thus the image ceases to be an end in itself - even more than just highly publicized and highly seductive icons of a new science, they implicate the objects they depict as malleable and kinetic.

 In Michel Certeau's 'Walking in the City', he describes the vertiginous experience of one observing the street from the top of the World Trade Centre as being created in distance and removal from the "grasp of the city", and later the collective experience at street-level of pedestrians as a "swarming mass (that) is an innumerable collection of singularities" (Certeau, p155). He describes the way in which sight functions as a voyeuristic activity that immobilizes the mass of individuals from a distanced perspective. To

walk the streets of the city therefore warrants an Icarian fall - to place oneself under the threshold of visibility 'down below' and to be immersed as a walker, a Wandersmänner, charting the trajectories of movements as a subjective and durational activity.

Salome Vogelin adds that the 'godlike' view from the tower results in total, objective knowledge whereas the activity of the man on the street is not receptive, but exploratory:

"De Certeau's city on the ground level is created by these blind practitioners, who by association hear rather than see its text, 'make use of space that cannot be seen' and produce with their footsteps the city as a heard phenomenon." (Vogelin 2010, p92; Certeau quoted in Vogelin 2010)

In the same way optical methods of observation and image creation that rely on focal distance are side-lined in favour of the physical exploration of the cantilever on and in the membrane. Nanovibrancy re-lies on this performativity of the membrane as process, replacing the static visual ontology of the sample with an auditory documentation of its material agency. The position of the listener in this case is ex-plored between his/her bodily presence within the soundscape and the perspectival distance arising from the representation and mediation of nanoscale audition.

Leaning on the surface of a Membrane

Nanovibrancy is as much a performance as it is a passive observation. Any sound that is heard relies on the inherent agency of the membrane, rather than on a form of composed or pre-determined activ-ity. This inclination to inflict and impose oneself on the activity of the membrane is both an artistic and scientific tension.   Since nanotechnology offer the capabilities to manipulate atomic particles, the impe-tus to 'do' something rather than just passively observe matches the expectations of sub-molecular re-arrangements, attaching and removing individual atoms, or even leaving marks on the surface as experi-mentally useful procedures.

The sounding of a membrane that 'amplifies' rather than 'affects' it emphasizes the sounds that are al-ready present in it. Jane Bennett refers to the "capacity of things . . . not only to impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendancies of their own" (Bennett 2010, viii), echoing Bruno Latour's definition of the "actant" which is a source of action which has an individual efficacy and the ability to modify another entity.   The mem-brane is seen, and heard, as an actant, with its own agency and efficacy.

But as a membrane - a flap of freely suspended 'skin'; it is implicated as an active listener of its environ-ment, extending the repository of internal sound to include its acoustic environment. Scanning the membrane reveals its internal structural mechanisms and the inter-atomic foces at its surface; it also reveals its exteriority within the medium of air and the vibrations it experiences as a result of gaseous atomic activity. The membrane thus becomes a dynamic actant whose agency is reflected in a state of becoming within its external acoustic milieu. Gaston Bachelard argues:

In its energetic folding the atom is becoming as much as it is being, motion as much as it is object (Bachelard quoted in Andrews 1992)

Similarly, the membrane as dynamic process literally and metaphorically usurps a visualist definition of the 'object' - it does not offer a static depiction of the sample. Instead, it stretches the effective image

into the observation of a process – of the object as a vibrant participant within its environment occupying a transitory middle ground "between potential and actual" (Andrews 1992).

In Nanovibrancy, the listener is brought into the space of the nano-cosm through a sharing of the acoustic environment of the membrane. Listening to the membrane thus creates a dynamic continuum that connects the listener and the object in an ensuing relationship within these energetic oscillations. The perception of sound is determined by the physicality of all the components that conduct it. Therefore, the physiological hearing activity, its model through the silk membrane and AFM assembly in Nanovibrancyexplore their "energetic unfolding" within the acoustic environment, becoming indicative of the continuum of vibrations through the membrane, air and listening bodies. As Salome Vogelin describes:

Listening produces me as a dynamic subjectivity intertwined with the dynamic things that are thinging the life-world rather than in relation to a substantial and permanent vis-à-vis of a transcendental world. Any connection of myself to another thing or subject ensues in this dynamic. (Vogelin, p 94)

By extrapolation, everything present is a dynamic actant involved in the sensitivity of the membrane. This presents an interesting contrast between the reductionist ontology of the 'atom' and the expansion of an ecology of materials into the macro-environment where it is defined not by itself, but in its enfolding external relationships. Georges Canguilhem's defines the milieu as "an array of decentred and mutually influential relations between an organism and its surrounding environment" (Canguilhem, quoted in Roosth 2009). By extension, the acoustic milieu therefore can be said to be made up of mutually influential assemblages of organisms and their environments within a landscape of vibratory oscillations.

The assemblage in Nanovibrancy is made up of connected things extending the vibratory continuum upward and outward into anything and everything in the environment but extends even further through the air in the room into the listening bodies.

The model of tympanic listening through a membrane implicates the physiological hearing pathway as a series of connected, conductive mechanisms all grouped in an assemblage that effects the eventual signal that is perceived, even as it is an indication of an inter-subjective phenomenon.

From the listening body, the room as the metaphor of a resonating chamber implicates its structural components as material participants rather than passive observers of the performance. Sound accentuates the physical construct of an architectural space because at certain "resonant frequencies", the walls of a room will begin to ring, presenting every constructed space as a palpable entity with its own sonorous potential.

In Nanovibrancy the perpetuating feedback loop between the listening membrane and the gallery space becomes an aggregating mass of auditory feedback. These frequencies that arise through this process do so at the natural resonant frequencies of the architecture. Albeit, the architecture is a dynamic entity in itself, responding to change in variables like human movement, air flow, thermal flux etc.

Imaginative Listening

Sounding the membrane does not only reveal the material assemblages that bridge the listener and the object through conductive resonance; but through the cognitive activity of listening, it furnishes an imaginative proximity to the source.

Sound draws together the sounding object and the listening body in a relationship fortified by the acoustic connection of the two. Where Nanovibrancy aims to bridge the distance of scale, this is not an acoustic one but more an imaginative one. By amplifying the membrane, it presents the illusion that transplants one, blind, onto the surface of the membrane – What would the eardrum sound like if we were small enough to stand near it? (Figure 2)

In the metaphor of the nano-scopic microphone, the stimulation of "magnified" listening also presents a duality of cognitive spaces. In the first instance, the recording of nanoscale vibrations situates the context of listening within a visual causation of atoms vibrating i.e. my mind sees images of the atom in motion, the atom in the assemblage and so on because I know that this is the supposed result of the experimental setup. But in alluding to a post-perspectival space away from the inclination towards visuality, perceiving the space of the nano-cosm becomes a fundamental activity in reduced listening. It becomes an imaginative, mythological realm where the image is abstracted into its visceral, somatic and immersive soundings. In this position, I do not know, and I do not have to know what exactly constitutes these vibrations, I hear, feel and am immersed in it as a tangible, vibrant and energetic gestalt.

Nanovibrancy thrives on the imaginative experience of sound, one that emerges from sensory extension of our ears into the nanoscale. In the actual performance, the sounds that were present in the gallery space were not stylized representations of nano-activity; instead I sought to present the sounds as they were. As a result, there were often patches of silence, or low-level static sweeps that were not the most interesting sounds possible. This artistic tension in allowing the sounds to be themselves became a defining character of the performance and the developments leading up to it.

Conclusion and Further Thoughts

Nanovibrancy thus presents a site-specific installation performance that subverts the optical expectations of an objective science. Through its amplification of the minute vibrations on the membrane's surface, it unfolds the nanoscale interactions of molecular bombardment and thermal interference as an evolving soundscape over time. This enhances the emerging rhetoric of nanoscience as being invested in the materiality of atoms and molecules and their interactions with each other, and within the broader molecular environment. With the proliferation of haptic feedback devices that provide users with more tactile control over their samples, the visual output would then become connected to this ability to contact and change, becoming more of a sensory accomplice in the creation and manipulation of nanostructures.

In its ability to reach into the nanoscale, nanoscience becomes a milestone in the creation of scientific knowledge. This potential to now see, touch and hear at such a small, yet physically grounded scale goes beyond the social constructions of art and science. And in the work of Nanovibrancy, it reveals a deeper essence that is found within the vibratory continuum existing at the nanoscale. The words 'minute', 'miniscule' and 'infinitesimal' that litter the discourses of nanoscience become more than imaginative sources but palpable entities; the connections we forge across scales of perspective are now

founded within the common ground of vibrant matter. Our listening ear is to be reinvigorated by knowing its place in the atomic assemblage, and our imaginative minds brought to new spaces of creative exploration through the immersion of sonic potential.

Gaston Bachelard reveals in the Poetics of Space that such imagination of the miniscule cannot be founded upon the logic of human-scale perception, but instead need to be subtended down the rabbit hole of abstraction and absurdity. And as Nanovibrancy locates itself between the spaces of material resonance and mythological imagination; the milieus of fact and fiction, the fertile grounds of imagination and reality now collide and reside in close proximity with each other.

Acknowledgements

References and Notes:

Andrews, Ian. 1992. "Miniature Sound: Notes for a Soundscape for a Radio Program on Nanotechnologies, Essays in Sound 1, Contemporary Sound Arts

Bennett, Jane. 2010. "Vibrant Matter. A Political Ecology of Things". Duke University Press Durham and London.

Binnig G and C.F. Quate. 1986 "Atomic Force Microscope". Physical Review Letters 56(9)

Bachelard, Gaston (1994). "Miniature", in The Poetics of Space. Trans. Jolas, Maria. Beacon Press, Boston. Pp 148 – 182

De Certeau, Michel. "Walking in the City" in The Routledge Critical and Cultural Theory Reader. Eds. Neil Badmington, Julia Thomas. Routledge London, 2008. pp149-165

Galison, Peter. 2006. "Nanofacture" in Sensorium, Embodied experience, technology, and contemporary art. Ed. Jones, Caroline A. MIT Press, Cambridge, MA pp171-173

Roosth, Sophia (2009). "Screaming Yeast: Sonocytology, Cytoplasmic Milieus, and Cellular Subjectivities" in Critical Inquiry, Vol. 35, No. 2. pp. 332-350.

Voegelin, Salome. "Listening to Noise and Silence: Towards a Philosophy of Sound Art." Continuum International Publishing Group, New York, 2010.

TOUCH INTERFACES – BETWEEN HYPERREALISM AND INVISIBILITY

DAVID OSWALD

In this paper current trends in mainstream multitouch interface design are analysed. Based on a critical review of Apple's iOS Human Interface Guidelines and on experience from teaching several multitouch design seminars, recommendations for design practice and some forward-looking statements concerning hyperrealistic interface metaphors will be derived.
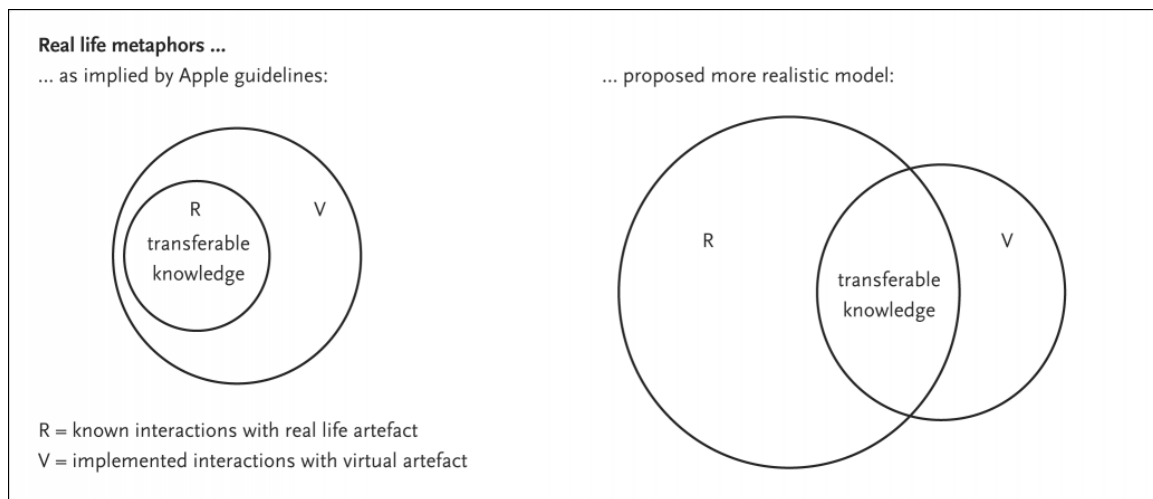
Figure 1: Knowledge that can be transfered from interaction with real life objects to interaction with metaphoric interfaces. Copyright by the author.

Figure 2: App prototypes from digital media seminars employing real life metaphors (left and middle) and standard software elements (right), 2010. Copyright by A. Berg, M. Bode, J. Heins (left), W. Holle, M. Oliveira, H. Richert (middle), D. Storm (right).

Introduction

Multitouch technology has existed for several years today. [1] While big multitouch tables have mostly been found in public places like exhibitions, small screen devices like multitouch smartphones have become an everyday phenomenon. In both cases the context of use has been different from the use of a desktop computer. Multitouch table systems often are designed for specific content, an individual location and fixed context of use. In contrast, smartphone applications are to be used in any context – due to mobility. With the emergence of medium sized multitouch devices like the iPad, more and more digital products, which are known from a work-related desktop context, are being redesigned for multitouch use. But just like the invention of the computer mouse was a prerequisite and an activator for the invention of graphical user interfaces and new software genres, [2] multitouch interaction is a prerequisite and activator for novel interfaces and the emergence of media formats and applications which are specific and typical for medium-sized multitouch devices.

Today two trends in multitouch interface design are already apparent: Photorealistic real live metaphors like wooden bookshelves on one hand and direct, touch-based interaction without any visible buttons or handles with content like maps on the other hand, or even sensor based interaction.

Realism and Learnability

The real-world metaphor approach has already a tradition in human-computer-interaction. The very first graphical user interfaces of the late 1970s where based on a visible real world metaphor. But due to technical limitations the visual style and the iconography of the desktop interface was quite abstract – black and white pixels only in low resolution. This relatively high level of abstraction helped to forget about the original meaning of these metaphors once the user's learning phase was left behind and the meaning of interface elements had been internalised. When seeing "menus" in a software application today, no one thinks of a restaurant's list of dishes. The idea of a restaurant menu was helpful in the early years of GUI, but today's computer users would be rather distracted or even confused by a photorealistic imitation of a restaurant menu card with "cut", "copy" and "paste" listed on it.

A second wave of more realistic real world metaphors hit the interface design discipline in the early 1990s when "interactive multimedia" became popular. Abstract and text-based interface elements like menus, buttons and drop-down-lists were replaced by the display of everyday objects in everyday environments. These were again real live metaphors – now with a higher level of detail, showing greater similarity between the real world objects and the visual representation. In spite of significant usability problems the naive realism of these interfaces was a success in so called "edutainment CD-ROM" applications. Attempts to transfer this approach to standard software (like Microsoft BOB) at this time failed completely. [3]

HYPERREALISM IN MULTITOUCH INTERFACES

Today applications on an Apple iPad again look like real objects. E-books look like real books, software calendar apps mimic paper sheets, leather covers and even chrome-plated spiral binding. Compared to 1990s multimedia the level of photorealism and the aesthetic quality are obviously superior, but the concept is the very same. And also the theory behind real-world metaphors is still the same: They should help the user understand and learn how to use virtual artefacts by transferring knowledge from real

world interaction to the computer world. In their Human Interface Guidelines for iPhone and iPad, Apple therefore recommend the use of real world metaphors as standard practice: "When virtual objects and actions in an application are metaphors for objects and actions in the real world, users quickly grasp how to use the app." [4] Addressing possible limitations of such an approach, Apple are worried only about possible shortcomings of the real-world antetype's functionality: "The most appropriate metaphors suggest a usage or experience without enforcing the limitations of the real-world object or action on which they're based. For example, people can fill software folders with much more content than would fit in a physical folder." [4] This is a quite one-sided view – only focussing on limitations of the real-world object and disregarding the limitations of the virtual object. When we see a book in the real world we exactly know what we can do with it, how we handle and navigate it and we also know what we are not able to do with it. With a photorealistic representation of a book on a screen this is different. Of course the resemblance to a book gives the user some clues how to possibly interact with the interface, but it is quite clear that the user can only interact in ways that are anticipated and implemented by the creator of the software. Probably it is possible to "flip pages". But there are several ways how to flip real books' pages – where do you have to touch the page, what kind of movement is expected? Is it possible for users to write annotations? How? Does it allow to mark pages with dog-ears – and why not? Is it possible to rip out pages?

Based on everyday experience we know how we can interact with our environment and what we can do with the objects surrounding us. Due to this everyday experience we are even able to anticipate possible uses and interactions with artefacts we have never seen or touched before, just by looking at them. [5] We immeditely know how our body relates to the objects, for instance if we can sit on it or where we can put our fingers in. And we successfully anticipate possible handling and mechanical constraints of objects. Well designed artefacts stimulate these expectations by indices – visual cues communicating their handling – and by that make a product self-explanatory and easy to use. "Which parts move, which are fixed? Where should the object be grasped, what part is to be manipulated? [...] What kind of movement is possible: pushing, pulling, turning, rotating, touching, stroking?" [6] Needless to say that the induced expectations should be met at the end. Elements that look moveable should be moveable in the expected way.

CAN INTERFACES BE NATURAL?

Most of this kind of everyday knowledge today is not "natural" but deeply rooted in technology driven culture. Interaction with light switches, bicycles or books may feel natural for us, but it is artificial. In any case there is not too much difference in figuring out how we can climb a tree (natural), or how we can use a knive (artificial). Both is based on experience, which implies that it has to be learned in the first place no matter if natural or artificial.

The same is true for virtual interfaces. We make asumptions about how they can be operated and controlled based on experience. This experience today primarily is experience with other virtual interfaces and only in the second place it is based on knowledge aquired while interacting with physical everyday objects. When test users of a gestural interface where asked what kind of gesture they would expect for accessing a selected item, the majority proposed pointing at it twice – a double tap in the air. [7] This is clearly not a natural gesture, but it has been internalised in years of performing double clicks in standard desktop interfaces. With more and more people growing up with digital media, the discrimination be-

tween knowledge from the analogue world and knowledge from the digital domain seems to be antiquated and obsolete. For so called "digital natives" a double click is more familiar and feels more natural than cracking a nut or peeling an orange.

When everyday objects are used as interface metaphors some interaction techniques will be anticipated and expected, but the intersecting set of possible interactions shared by real and virtual artefacts is actually rather small and is determined entirely by the software design. So there is are two gulfs to bridge in order to use such an interface effectively. One is the difference between what the real objects allows or affords to do and what the virtual one does not. The second gulf is the difference between what the virtual interface allows or affords and what the real thing does not (see figure 1).

Invisibility and Intuition

Actually the problem is not the difference between the two sets of interaction possibilities but the lack of knowledge about it. In interfaces with a hyperrealistic reproduction of everyday objects this lack of knowledge is mainly caused by a lack of visibility. The interface lacks visual cues of what is operable and what is not.

Despite this conflict between real life metaphors and visibility, Apple also recommend to pay attention to readily identifiable interactive elements: "Controls should look tappable. iOS controls, such as buttons, pickers, and sliders, have contours and gradients that invite touches." [4] Already a superficial analyses of iOs applications shows that this works fine in abstract interfaces where clickable elements are clearly discernable – by visibility and by convention. But real live metaphors often lead to inconsistencies. Shape and materiality of virtual objects "invite touches" where touching has no effect. Then again clickable and movable objects are not identifiable by the eye: paper pages do not look scrollable, telephone numbers do not look clickable.

For decades mobile device interaction lagged behind desktop software, mainly due to hardware limitations. Since the introduction of the iPhone in 2007 it has been the other way round: interaction techniques of mobile devices drive innovation in standard desktop interaction. Apple continue to implement multitouch gestures, which were developped for mobile touchscreens, to classic input devices like the trackpad and the "Magic Mouse" a mouse with a multitouch area on its upper surface. In the tradition of the "direct manipulation" interaction paradigm, this is said to make interaction more intuitive: "New Multi-Touch gestures [...] let you interact directly with content on the screen for a more intuitive way to use your Mac." [8] Several different definitions of intuition exist in philosophy and psychology. It is probably easier to agree on what intuition is not: It is not a discoursive or conscious process of reasoning. It rather is a way of judging and decision making without analytical reflection, mainly based on tacit knowledge. Tacit knowledge is indeed unconscious. But it is also, like knowledge in general, based on experience – that means it has to be learned. For instance there is no "natural" way of interaction with a map, because using maps is already a cultural technique. Once we learned how to work with real maps this knowledge can be helpful to work with digital maps as well. Touching and moving maps around works intuitively indeed, but Apple offers more: "New gestures include momentum scrolling, tapping or pinching your fingers to zoom in on a web page or image, and swiping left or right to turn a page or switch between full screen apps." [8]

The popular two fingers "pinch" gesture to zoom maps, images and websites is not intuitive at all: Neither the interface shows any sign that would indicate "pinchability", nor does the idea of a real map or photograph suggest "zoomability". Again the problem is that the virtual artefact does not actively communicate what kind of interactions are possible in addition to our tacit knowledge from the real world. The pinch gesture is successfull, not because it is so intuitive – it simply isn't. It is merely easy to learn

and easy to remember. Actually it is not based on a real life metaphor – in the physical world it is hard to find any example where objects can be scaled by simply moving two fingers. But still it is learned and remembered easily due to the simple analogy it is based on: A change in distance of the two fingertips is proportional to the change of the size of the touched object. Accompanied by direct visual feedback the logic of this interaction method is understood immediately.

But without knowing that one can "pinch" a map or a photograph hardly anyone one would try. This simple fact does not attract too much attention because seeing the gesture just once in one of Apple's TV commercials for the iPhone or the iPad will suffice to understand and remember. This leads to the conclusion that interaction does not need to be intuitive, but has to be learnable.

Conclusion

Merely copying reality does not necessarily lead to understandable interfaces. When using real life metaphors, designers have to be very conscious about interaction disparities between real and virtual objects.
Much more important than intuition is a good balance of learnability and effectiveness. What a good balance is of course depends strongly on the type of user and the context. Especially in professional software intuitive use and learnability do not have to be top priority. In the long run rather ease of use and effectiveness are crucial. For a software that is used on a daily basis and for years some learning effort for the sake of effectiveness will be worthwhile.

The terms "simple", "easy" and "intuitive" seem to work perfectly as marketing phrases. As general and universal goals in interaction design they should be refused. Often easy to use artefacts do not have too much potential and power. Just take a violin and a triangle (the percussion instrument) and consider their learnability and their potential – probably not everything in life should be about ease.

References and Notes:

1. Bill Buxton, "Multi-Touch Systems that I Have Known and Loved," March 2011, http://www. billbuxton.com/multitouchOverview.html (accessed June 26, 2011).
2. Bill Moggridge, *Designing Interactions* (Cambridge, MA: The MIT Press, 2007), 27-29.
3. Knight-Ridder/Tribune, "Microsoft Bob Still Lives, At Least In Certain Spirit," *Chicago Tribune*, February 2, 1997 http://articles.chicagotribune.com/1997-02-02/business/9702020089_1_ microsoft-office-user-interface-microsoft-products (accessed June 26, 2011).
4. Apple Computer Inc., ed., *iOS Human Interface Guidelines* (San Francisco, CA: Apple Computer Inc., 2011).
5. James Jerome Gibson, "The Theory of Affordances," in *Perceiving, Acting, and Knowing: Toward an Ecological Psychology*, ed. R. Shaw and J. Bransford, 67-82 (Mahwah, NJ: Lawrence Erlbaum, 1977).
6. Donald Norman, *The Psychology of Everyday Things* (Jackson, TN: Basic Books, 1988), 99, 197.
7. Dema El Masri, "New Dimensions for compArt" (master's thesis, Bremen University, 2011).
8. Apple Computer Inc., "Mac OS X Lion With 250 New Features Available in July From Mac App Store," Apple's official Web Site, June 6, 2011, http://www.apple.com/pr/library/2011/06/ 06lion.html (accessed June 26, 2011).

THE LIGHT AT THE END OF THE TUNNEL: AN INTERACTIVE INSTALLATION IN PUBLIC SPACE

Selin Ozcelik

While the interactive media become ubiquitous in public space, how it communicates with its site stays as a question. In this paper, an alternative answer is offered by analysing a multimedia installation focusing on how the social components are triggered by digital interaction. Consequently, the importance of social integration and social-site-specifity become apparent as additional components in the design of interactions in public space.

no caption

"*Like all social practice, spatial practice is lived directly before it is conceptualised...*" [1] (Lefebvre 1991)

It was a rainy day in April 2010 in Frankfurt. As one of the most central junctions of the city, Willy Brandt square was crammed with many people who were hastening to their goals. People who were hurrying up to the main station, waiting for their trams at the tram station, waiting in a line in front of the theatre, walking through the opera building at the bank square. Business women, business men, students, employees, unemployed, visitors and habitants of Frankfurt, old people, young people, children...The passers-by of this junction were streaming to the underground metro station as the rain flows to the underground.

A man's shouting was heard at the metro station 'I am Paul Auster! It is not my real name!'. People could not realise what was happening down there. 'You are the baleful one, that maculates the country', the other one answered accusingly. Then a scared young woman stated 'I think... you never had loved'. Then another woman was proud of herself stating that she had a mission there. Surely, people could not understand what was happening at their usual metro station on that day overhearing the loud yells of all these people. After a few steps a light theatre welcomed them at the top of the escalators with the voices of Quinn of Paul Auster, Terasias of Sophokles, Lulu of Wedekind, and Motte of Stockmann under the stage lights.*

'The Light at the End of the Tunnel' is an interactive sound and light installation, produced by Atelier Markgraph GmbH in collaboration with city theatre Schauspiel Frankfurt, Martin Lighting Professionals and the station managers VGF, for the fifth Light Culture Festival, Luminale 2010 in Frankfurt . The Light Culture Biennale, Luminale, is held parallel to the Light + Building trade fair every two years in the city. [2] It is a creative platform which make the light professionals and lighting artists, designers, urban planners and architects meet, and gives them an opportunity to illuminate all over the Rhein-Main region collaboratively and innovatively. During the festival, the city becomes an open space to create site specific illuminances. Around 150.000 visitors of the festival witness a colourful ambience around the sky scrapers, on the historical museum buildings, at the public squares and through the boulevards of the city. That is to say, during the Luminale the light becomes a medium to transform the city into an art space creating new visual experiences through it.

Hosting also the city theatre, Schauspiel Frankfurt, the underground station at Willy Brandt square is a meeting point of thousands of people during the Luminale. With four entrances and three floors, it is an intersection of six underground metro lines. Within a human traffic, the passers-by's experience of 'the Light at the End of the Tunnel' starts at the entrance of the station with the voices of the actors from the original theatre plays, and with the guidance of floor markings. After walking through these, at the B-level of the station, people encounter a bright, colourful theatre scene with moving stage lights and an eight-meter-long LED panel. It is a set for passengers and passers-by whose audience are the people driving the escalator. As they move on the stage, they can activate quotes taken from current plays at Schauspiel Frankfurt. By stepping on one of the role markings, a passer-by can trigger the stage lights which spot him, the LED panel which lights the quote of corresponding character of the role marking, and the sound which is vocalized by the theatre player. In this means, a multimedia performance takes place interactively. A quote from a classical play and another one from a contemporary play were embodied by the participants like a conversation. Similar to the stage at 'Théâtre de l'espace'**, 'spectators experienced the scenes juxtaposed with one another, whether in a planned confluence or a chance intersection of sights, sounds, and narrative.' [3] With this interactive setting, a passer-by creates his/her own theatrical narrative by experimenting different roles of this interactive play. Additionally, s/he can be a part of a common performance where the other fellows act on the stage. In both cases, purposely or unknowingly, people, who only pass by, become the actors or the audiences of a theatre play which narrates 'the moment' in this specific public space.

That is to say, it can be claimed that 'The Light at the End of The Tunnel' is nourished with its potentials in enhancing these moments and in triggering social interaction among people. Besides that, it also sustains the social interaction supporting the social function of its public space as a component of digital interaction. It uses light, sound, graphic not only as architectural components but it congregates them via interaction and supports the public content of its site. Beside the regular function of this public space, it provides people an opportunity to involve in creating another social layer in this public space. A metro station, as a place where people only go by, is transformed into a public space where an additional social communication level achieved via multimedia. They pause, they share moments and create their own narratives with fellows or with strangers using interaction. They try to catch the stage light on themselves, jumping on to a classical role from a contemporary one to create an absurd dialog or moving continuously to change the light ambience of the whole room. With the presence of such an interactive installation at a metro station, people become aware of the 'publicness' of this public space that they have already become a part of, and start to construct a new kind of social relation with people around them. It is definitely a physical intervention to their usual, mundane, every day space which creates awareness via attention, participation, collaboration and performance taking place in this public space.

Thus, 'the Light at the End of the Tunnel'*** becomes also a catalyst to arouse social interaction there. In this sense, this place gains a public layer beside its functionality where people share an experience. In that means, if McLuhan's approach of 'the light as medium itself' is considered, it can be claimed that, 'the Light at the End of the Tunnel' transcends being a 'light bulb' [5] with the communicative exchange with its public. Within a context of a light festival, it intervenes the public space creating a dynamism in social interaction. This is because it is not only site specific in terms of architecture but also site-specific for its social context. With this social-site-specifity, the installation as an 'intervention' in the public space becomes an 'integration' into the public space by stimulating and supporting its publicness.

References and Notes:

In this project, ten roles and around fifty quotes from the plays in the April 2010 programm of Schauspiel Frankfurt were selected for the interactive setting. These plays were 'Antigone' of Sophokles, ' Oidipus of Sophokles ', 'Das blaue blaue Meer' of Nis-Momme Stockmann, 'Lulu' of Frank Wedekind, 'Stadt aus Glas' of Paul Auster, ' Phaedra' of Jean Racine and 'Geschichten aus dem Wiener Wald' (Anonymous).

** Théâtre de l'espace is an experimental space performance by Architect Edouard Autant and actress Louise Lara. In Gray Read's words this experiment 'used theatre to investigate architecture as an art of situation, of placing people in meaningful spatial relationships with one another. Autant designed the Théâtre de l'espace to model the experience of an urban plaza with multiple, simultaneous scenes that both surrounded and were surrounded by the audience. Performances juxtaposed fictional narratives, improvisation, and real situations to propose a paradigm for public space in a modern, collective society. Through theatre, Autant and Lara investigated architecture not as form but as action, a practice particularly relevant to design in cities.'*

***The Light at the End of the Tunnel won the prizes iF Communication Design Award 2011 (Gold-Interactive Installations), German Designers Club Award (Silver-Environmental Design/Architecture), Art Directors Club Germany 2011 (Bronze-Events).*

1. *Henry Lefebvre, The Production of Space, trans. D. Nicholson-Smith (Oxford: Blackwell Publishing, 1991), 34.*
2. *Luminale 2012's official Web Site, "Luminale 2012 Call for Projects," http://light-building. messefrankfurt.com/frankfurt/en/besucher/events/luminale.html (May 22, 2011).*
3. *Gray Read, "Theater of Public Space: Architectural Experimentation in theThéâtre de l'Espace (Theater of Space), Paris 1937," in Journal of Architectural Education 58, no. 4 (2005): 53-62.*
4. *Marshall McLuhan, Understanding Media: The Extensions of Man (New York: McGraw-Hill, 1964).*

THE RHETORIC OF THE JPEG

DANIEL PALMER

As a method of compression for digital photography associated with the World Wide Web, the JPEG is today the default mode by which we experience on-screen images. Curiously taken for granted in discussions around digital photography, this paper asks what is at stake in the development and implementation of this standard, and proposes that the JPEG is a social and ideological phenomenon.

JPEG compression artifacts (saved at low quality) Image credit: Daniel Palmer.

Fifty years ago, Roland Barthes famously called the photographic image "a message without a code". [1] Barthes was concerned with its illusionary transparency or 'photographic paradox', the double structure of what he called 'denoted' and 'connoted' meanings operable in the reading of any photograph. Three years later in his essay "The Rhetoric of the Image" (1964) – hinting at the medium's indexical nature that later preoccupied him in *Camera Lucida* – Barthes tells us that the relationship of signifieds to signifiers is not one of 'transformation' but of 'recording'. As such, he argued that *reading* a photograph involved relating it to a rhetoric – all the social codes within which signs make sense to readers (including the function of postures, expressions and gestures; associations evoked by depicted objects and sequences; and accompanying text). Yet the image itself, Barthes argued, is "a message without a code", since being "captured mechanically" it does not involve "rule governed transformation."

Charge-coupled devices (CCD) were already under development when Barthes published those essays. By 1969 CCD sensors could convert photos to electrons, collecting light and converting it to a voltage charge and a numerical code. And by the mid-1970s, computer programmers set to work on developing

compression techniques that would eventually lead to standards such as JPEG and TIFF. Digital photography is encoded all the way through, in elaborate algorithms built of zeros and ones, yet this code remains as invisible as the social codes that govern the reading of images. Under normal circumstances, when we see a digital image on-screen, or printed on paper, its numerical basis is repressed. The makeup of the image only becomes visible when the algorithms are pushed, typically in the form of cosmetic disturbances such as jagged edges. Usually undesired, compression artifacts – and other blocky raster effects – are like the accident in Paul Virilio's economy of speed, unforeseeable but substantive. Compression artifacts have themselves become the basis for creative exploration, most famously in Thomas Ruff's *jpeg* series, which ironically demand to be seen in the flesh, rather than on-screen.

What is a JPEG? The Evolution of a File Format

As a method of compression for digital photography closely associated with the World Wide Web, the JPEG is today the default mode by which we experience on-screen images from computer monitors to mobile devices. According to a 2011 press release from the official site of the Joint Photographic Experts Group that gave their name to the format, over a trillion JPEG images have been created (see www. JPEG.org). The same press release states that the format has "contributed to the progress of e-commerce, where digital images offer new opportunities in the form of products and services" and that "the existence of standard image coding formats" has been an "enabler" of our "digital imaging ecosystem". Facebook and Flickr are celebrated as part of that ecosystem, while the growth of the online pornography industry is unsurprisingly neglected (Thomas Ruff once again draws our attention back to this them in his *Nudes* series).

Most photographers and media theorists – surely everyone reading this – know that the JPEG is a technical standard that specifies how continuous-tone image data is compressed into a stream of bytes and decompressed back into an image. Beyond that, the JPEG is strangely unknown, almost completely neglected in the critical literature around digital photography. On the one hand this is unsurprising; after all, most photographers barely understood the history of Kodak, Agfa or Fuji film stock either. It was just a neutral substance, and the choice to use one or the other was based as much on habit as aesthetic preference. As for the (art) history of photography, where the final image is privileged, discussion of the technical means of its production is considered vulgar (even as this is a regular topic of conversation among photographers themselves). But the JPEG is different from film, since it is not something we choose to use, being built into cameras and the default file-sharing format. Undoubtedly its history – buried in reports and technical releases – is obscured because it appears so 'natural', and so concurrent, to the digital era. And indeed, its history is unremarkable. Following early research in the 1970s around the 'discrete cosine transform', international standards bodies began the push for an image compression standard in 1982. The resulted in the formation of the Joint Photographic Experts Group in 1986 – as a joint committee between the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU). The official standard dates to 1992 in Geneva.

As part of that "general interface between systems of equations and sensory perception" – as Friedrich Kittler describes computing – the JPEG format was designed to exploits the human eye's differing sensitivity to chrominance and luminance, to discard information that the eye cannot easily see. [2] Essentially this means the so-called 'redundant data' of subtle color distinctions and high frequency brightness variations. However, since the quality of the image declines as this data is removed, JPEG compression is considered 'lossy'. The original format offers only 8 bits of data per color, providing a relatively coarse

256 levels between complete darkness and complete brightness. Images containing large areas of a single color, such as blue skies, are therefore particularly prone to compression artifacts. Nevertheless, a 20:1 compression ratio can be achieved without noticeable loss of quality. If rhetoric is classically defined as "the art of adapting discourse, in harmony with its subject and occasion, to the requirements of a reader or hearer", the rhetoric of the JPEG involves reducing an image's file size to the minimum without drawing attention that loss.

Smaller file sizes are useful for two obvious reasons: to save memory or disk space, and for faster transmission across networks. Since JPEG compression was developed at a time when memory was expensive, camera makers welcomed more images fitting on a memory card. Moreover, the release of the JPEG format coincided with the first popular graphical web browser, NCSA Mosaic, in 1993, quickly followed by Netscape, Interent Explorer and the popular explosion of the Web in the mid-1990s. In those early years, so-called 'progressive JPEGs' divided image files into a series of scans for progressive rendering as they loaded over slow dial-up modem connections. Each scan gradually improved the quality, with the image slowly loses its blurriness and becoming clearer. But even this did not stop me from choosing the option of 'turning off images' in the browser preferences – an option still available on many web browsers.

As Lev Manovich suggested in 1995, rather than "an aberration, a flaw in the otherwise pure and perfect world of the digital", "lossy compression is increasingly becoming the very foundation of digital visual culture." [3] Indeed, amateur photographers have proved unexpectedly content to accept a lower quality image for the convenience of digital speed. Kodak, in particular, eventually admitted their early miscalculations on this front. As the bulk of their profits had come from manufacturing film, Kodak came belatedly to promoting digital cameras for obvious reasons – and not least as they mistakenly believed that film sales would continue to flourish simply because celluloid produced a superior image. Kodak, perhaps more than any other company, should have realised that economics and efficiency always win out over image quality.

Image quality remains the primary discourse in which JPEGs are understood by the photographic community. A typical online photo-lab will offer advice regarding the level of JPEG compression that "will not lead to visible loss in quality or detail." More dramatically, a best-selling guide to Photoshop proposes that: "shooting in JPEG mode is like taking your film to a high street photo lab, throwing away the negatives and then making scans from the prints." [4] The argument here – spurred on by the rise of so-called RAW and DNG (digital negative) files – is that JPEGs are degraded, even inauthentic, copies. It echoes a common misconception about JPEG images that they degrade each and every time they are opened. For serious amateurs and professionals, RAW and DNG files are akin to 'digital originals'. Even more than compression is at stake: JPEGs are associated with 'destructive editing' and tied to 'in-camera' processing of qualities like colour balance and sharpness, as opposed to the ability to post-process such settings in software like Photoshop, Lightroom or Aperture. In many respects the RAW vs JPEG debate thus updates the craft versus automation tension that Julian Stallabrass discusses in his 1996 essay "Sixty Billion Sunsets". [5] On one hand, the drive behind JPEG-producing point-and-shoot camera design is to automate what used to be called 'previsualisation' –most recently including smile-activated shutters and 'face recognition' that prioritise the focus and exposure when a familiar face appears in the frame. Stallabrass' argument – that relieving the camera user of manual control has the paradoxical effect of *mystifying* the camera's processes – still holds. Indeed, iPhone apps even play with the automated 'developing' of JPEGs in nostalgic ways (leading to recent minor controversy when photojournalist Damon Winter won an award for using the Hipstamatic app in Iraq). On the other hand, the economics of film-less photography also encourages photographers to 'over-sample' the subject, and defer their

imaginative conception of the image to its post-processing. The increasingly widespread awareness that to post-process JPEGs is to risk an avalanche of artifacts has at least focused attention, among serious amateurs, to file formats, including the issue of the proprietary nature of RAW files and format obsolescence.

More importantly than image quality, the JPEG format is part of the new computational logic of photography. Crucially, all digital cameras also save JPEG files with EXIF data – an acronym for Exchangeable Image File. The term exchange is key here. The camera model and settings such as shutter and ISO speed, aperture, capture date and time, focal length, metering and flash mode, and geolocation are all stored as metadata – helping to enable images to be catalogued, searched, shared and used. Likewise, descriptive tags – increasingly semi-automated via software may also be built into the JPEG image via EXIF data. This metadata is fundamental to the workings of photo-sharing and social networking sites, and is part of the way the JPEG protocol enables *interoperability*. [6]

The Ideology of the JPEG?

The underlying question in this paper is: in what sense is the JPEG file format significant to or even determining of photographic cultures? That is, what are the unexpected consequences of a file format that has become the universal standard? My approach borrows from the emerging field of study known as 'software studies'. Lev Manovich, pioneering the field, has argued that there is no such thing as digital media in general, no "properties of a medium", only operations and affordances defined by software. [7] More recently Manovich has argued that software studies aims "to investigate both the role of software in forming contemporary culture, and cultural, social, and economic forces that are shaping development of software itself". [8]

Jonathan Sterne's work on the mp3 as an historical, cultural and political phenomenon is instructive here, enabling us to think about the JPEG as a format whose ubiquity across devices facilitates particular photographic practices. As Sterne notes, the mp3 is a form designed for massive exchange, casual listening and massive accumulation. As he argues: "The possibility for quick and easy transfers, anonymous relations between provider and receiver, cross-platform compatibility, stockpiling and easy storage and access" were all "built into the [file] form itself." [9] Precisely the same can be said of JPEG. Adrian Mackenzie, in an article on 'codecs' in Matthew Fuller's book *Software Studies: A Lexicon*, has shown the complexity of examining the MPEG format, arguing that its performative calibration, within precise "psycho-perceptual parameters", "refers implicitly to a great number of material entities ranging from screen dimensions through network and transmission infrastructures." [10] All of which is also true of JPEG.

Paul Caplan has recently argued that "protocols such as JPEG and XML 'determine' a new scopic regime characterised by network relations which is built around a discourse of 'the archive' and an ideology of visual democracy." [11] Caplan describes the JPEG as a protocol object, so familiar that it has "become transparent and taken for granted." [12] In this sense JPEG extends the discourse and sales pitch of photography, which has always been one of ease of use, accessibility and openness – that it is, "a nominally democratic medium". But as Caplan also observes, "this discourse of participation is clearly ideological when these imaging practices are located within the complex relations of ownership, control and power". [13] The new scopic regime is articulated around networks that are closed, proprietary, its "image spaces, existing as part of new media giants' such as Yahoo and Google's portfolios of dataspaces primed for mining and advertising, are actually private commodity spaces". [14] Borrowing,

among others, from Bruno Latour's 'actor-network theory' and Graham Harman's 'object-oriented philosophy', Caplan treats "the jpeg compression protocol as an 'actant' doing things in the world: making images findable and viewable in browsers; making them small enough to be distributed and exchanged in mobile spaces; playing a part in Facebook's face recognition business plans and Apple's App store domination." [15] The JPEG is thus 'enfolded' in imaging practices and industries, not to mention the economic-political relations of Web 2.0.

In the popular imagination, the JPEG stands for the democratisation of image making and the global distribution of the image. Take the rise of the amateur in news reporting. Iran was labelled 'The JPEG Revolution' on the front page of the *International Herald Tribune* newspaper in 2009. Indeed, we can be grateful that the JPEG is a royalty-free, open-source codec established by a non-profit UN-style organisation. Yet the primary motivation of the JPEG committee is to accelerate the adoption of new imaging products and services by the market. Today, as Caplan notes, images must become JPEGs, either captured or converted as such, if they are to find a place within social media. [16] By making the JPEG standard freely available, software publishers and hardware manufacturers can integrate support for the new file format into their products. Furthermore, the openness of the format is far from guaranteed. For instance, the JPEG committee recently formally adopted JPEG XR – extended range – as part of the continual evolution of the format. Although what was eventually ratified is an open format, Microsoft had hoped to retain some proprietary control when it submitted its 'HD Photo' format to the international standards organization in 2007 with greater dynamic range, a wider range of colors, and more efficient compression.

In 2010, Google – as part of its "make the Web faster" effort – announced a new WebP graphics format (pronounced 'weppy') with claims that its use could cut image file sizes by 40 percent. In a move that once again demonstrates the socio-technical basis of digital aesthetics, WebP has a tendency to blur images rather than create a JPEG like blocking – and is therefore better for facial skin tones in particular. Earlier this year, Google quietly slipped this potential 'JPEG killer' into Gmail, Picasa and its Chrome browser. If used, these Google interfaces automatically and invisibly convert JPEG images to WebP. Google's move is directly related to its effort to push their new web video format, WebM. In any event, faster file transfers and lower network burden are obviously attractive for Google, who point out that images make up 65% of the typical data of a web page. But there are penalties: encoding and decoding WebP images takes significantly more distributed computing power. And while both WebP and WebM are open formats, we should never forget that all the data around online images gets mined to become part of valuable algorithms to be patented and used to direct the unpaid labour of online attention through which audiences provide the basis for the advertising economy.

After twenty years, the JPEG is a powerful incumbent – built into every camera, Web browser, image-editing program, pharmacy photo-printing kiosk, and mainstream operating system in existence. These material environments illustrate the complex forces and relationships within which practices of digital photography operate, and invite us to move away from perspectives that seek the essential characteristics of the technology. By virtue of its ubiquity and association with the Internet, the JPEG is rhetorically tied to the idea of democracy in an age of distributed imaging, in which the image has been spatialised in global databases. More broadly, the very manner in which computer software in general separates the (image) interface from algorithm "makes it a powerful metaphor for everything invisible that generates visible effects, from genetics to the 'invisible hand' of the market", as Wendy Chun has recently argued. [17] The rhetoric of the JPEG, its persuasive power, lies in this same invisibility. As with the very idea of 'analogue photography', perhaps only once it is outmoded will the JPEG move into the critical light.

References and Notes:

1. Roland Barthes, "The Photographic Message," in Image-Music-Text (London: Fontana, 1977), 17.
2. Friedrich Kittler, Optical Media: Berlin Lectures 1999, trans. Anthony Enns (Cambridge, MA: Polity, 2010), 228.
3. Lev Manovich, "The Paradoxes of Digital Photography," in Photography after Photography: Memory and Representation in the Digital Age, eds. H. von Amelunxen, S. Iglhaut and F. Rötzer (Munich: G+B, 1995), 58-66.
4. Martin Evening, Adobe Photoshop CS4 for Photographers (Waltham, MA: Focal, 2008), 120.
5. Julian Stallabrass, "Sixty Billion Sunsets," in Gargantua: Manufactured Mass Culture (London: Verso, 1996), 13-39.
6. Paul Caplan, "London 2012: Distributed Imag(in)ings and Exploiting Protocol," in PLATFORM: Journal of Media and Communication 2, no. 2 (2010): 6-21.
7. Lev Manovich, The Language of New Media (Cambridge, MA: The MIT Press, 2001).
8. Lev Manovich, Software Takes Command (Cambridge, MA: The MIT Press, forthcoming). The draft of the book can be downloaded at http://lab.softwarestudies.com/2008/11/softbook.html (accessed June 11, 2012).
9. Jonathan Sterne, "The MP3 as Cultural Artifact," in New Media and Society 8, no. 5 (2006): 829.
10. Adrian Mackenzie, "Codecs," in Software Studies: A Lexicon, ed. Matthew Fuller, 54 (Cambridge, MA: The MIT Press, 2008).
11. Paul Caplan, "London 2012: Distributed Imag(in)ings and Exploiting Protocol," in PLATFORM: Journal of Media and Communication 2, no. 2 (2010): 5.
12. Ibid., 1.
13. Ibid., 2.
14. Ibid., 5.
15. Paul Caplan, "the Internationale," the Internationale's Web Site, http://theinternationale.com (accessed June 7, 2011).
16. Ibid.
17. Wendy Hui Kyong Chun, Programmed Visions: Software and Memory (Cambridge MA: The MIT Press, 2011), 2.

EXAMINING ISSUES OF BODY IMAGE AND COMPLEX REGIONAL PAIN SYNDROME WITHIN THE DIGITAL

MARK PALMER

Drawing upon the creation of a digital tool to replace self portrait sketches in the diagnosis of Complex Regional Pain Syndrome we will examine the body's depiction in the digital, drawing upon patient interviews to explore how the digital can help us understand our body image. In so doing it will challenge phenomenological accounts of the body and seek critique the structures that often assert the digital as an incorporeal space.

Introduction

Body image can be altered by pain, 'peripheral 'injuries such as amputations, or insults to the central nervous system. These conditions have also formed the basis of Merleau-Ponty's philosophical enquiry into how we might understand embodiment. Within clinical practice attempts are made to 'repair' patients' body image through rehabilitative techniques however the means of assessing these changes has been that of self-portrait sketches.

The use of self portraits has been problematic in that it has often been limited by the abilities of the patient and, not without irony, the additional limitations that the condition itself can place upon them. Alexa Wright's work on the Sci-Art funded *After Image* project (1997) investigated the phenomena of phantom limbs however the techniques involved in creating these images were not ones that could be easily utilised by patients within a clinical setting. As a result of this research was instigated that examined the possibilities of the manipulation of an avatar for suffers from Complex Regional Pain Syndrome (CRPS) within the Digital to communicate their experience of their body image. This was instigated by allowing patients to remove, scale, displace and render the body in a variety a ways.

This paper will examine issues concerning the perception and depiction of the body within the digital. It will draw upon research interviews with users of the system to explore how the digital, rather than promoting notions of 'virtual' self can help us understand our experiences of the physical. In so doing it will draw upon a phenomenological understanding of embodiment and seek to critique the structures that often assert the digital as an incorporeal space.

Complex Regional Pain Syndrome (CRPS) was first identified during the American civil war when it was named *Causalgia* derived from the Greek words for pain and heat which are symptoms typical of the syndrome. CRPS is associated with the body's extremities and can affect whole limbs. It is defined by two forms, Type 1 (CRPS1) and Type 2 (CRPS2), but the nature of the pain of this is common to both forms. In CRPS 2 the pain can (albeit disproportionately) be associated with identifiable nerve lesions or tissue damage however in CRPS1 there is no identifiable injury that can be associated with the pain that is suffered.

Our understanding of CRPS is still in development and there are still different sets of criteria for its diagnosis; a situation most likely exacerbated by the fact that many of its symptoms are not identifiable through the use of objective tests. As we have noted a common factor is chronic pain associated with heat; this is accompanied by extreme sensitivity and painful reactions to everyday sensations such as the touch of clothing. Along with this there are a range of other symptoms that may be experienced that can include the perceived (and sometimes actual) swelling of limbs and the sense that the affected region does not belong to the patient; in some cases this can lead to a desire to have the limb amputated. Perhaps one of the most perplexing aspects of these symptoms for patients and clinicians is that they can vary greatly through the course of a day.

As a result of these factors there has been a tendency to believe that there is a psychological basis to CRPS. However a systematic review[1] of research concerning this relationship has suggested that there was 'no relationships between psychological factors and CRPS1'. In fact the frustration of trying to understand and convey these symptoms can be more of an issue, in fact one patient involved with our study noted that 'I really thought I was losing it.'

 If the range of experiences described are not the result of the patient's psychological makeup how might we begin to understand these symptoms?

Body Image

Although body image is susceptible to distortion through psychological factors (as seen in conditions such as anorexia nervosa) neurological studies have shown that other factors play into its creation.

Work by Ehrsson, Holmes and Passingham's has sort to investigate this through an investigation of the "rubber-hand illusion". The illusion concerns the perception that a rubber hand was a part of a subject's body; this was generated by providing sight of a rubber hand being brushed whilst simultaneously brushing the subject's hidden hand. Ehrsson et al sought to establish whether the illusion was more than simply a result of the visual representation of the hand being brushed. This was tested by blindfolding their participants and moving the subjects hand to touch the rubber hand whilst simultaneously touching the participants hand in the 'same' place.

The results demonstrated that the illusion could be generated though synchronous touching without the need for a visual representation. Further tests also asked subjects to locate the index finger on the hand subject to the illusion. This revealed an error in locating the finger that appeared to be dependent upon the veracity of the illusion. Given this it appears that the illusion's power was such that it remapped the perception of where the participant's hand was in space.

The Role of the Somatosensory System

The Somatosensory system incorporates the receptors and processing that provide our sense of touch, temperature, body position (proprioception) and pain (nociception). McCabe, Cohen, Hall, Lewis, Rodham and Harris have proposed that disruptions within the somatosensory system can begin to account for the symptoms described within CRPS[2]. They note how our body image is formed through the

...integration and processing of multimodal sensory percepts that involve the peripheral nervous system and central nervous system (CNS).... This is not a unidirectional system, whereby the CNS simply responds to a peripheral stimulation, but is a bidirectional process in which CNS activity may induce consequences.

This has some reaching consequences for our understanding of what we might understand body image to be. We often assume that our bodies are a given around which our perceptions are formed. The phenomenologist Edmund Husserl notes that

The Body is in the first place the medium of all perception...the zero point of orientation... each thing that appears has eo ipso and orientating relation to the body. (Edmund Husserl, *Ideas II* trans. Rojcewicz & Schuwer, Kluwer, 1989 p 61)

This is perhaps most clearly expressed in the phenomenology of Maurice Merleau-Ponty.

If my arm is resting on the table I should never think of saying that it is beside the ash-tray in the way the ash-tray is beside the telephone. The outline of my body is a frontier across which ordinary spatial relations do not cross. This is because its parts are interrelated in a peculiar way: they are not spread out side by side, but envelope each other. (Maurice Merleau-Ponty, *The Phenomenology of Perception,* trans. Colin Smith *,* Routledge, 1962 p98)

Phenomenology quite literally places the body centre stage and one might even claim that Merleau-Ponty's philosophy is based around an a-priori status for the body. In contrast to Merleau-Ponty's assertion, within CRPS we discover patients who can experience a limb to be foreign to their body and who possess 'a poor awareness of its location in space'.

 In fact when asked to move an affected limb suffers of CRPS often do not move the limb itself but move from the unaffected part of their body as if the limb were an *object*within their peripersonal space (and therefore affectively 'besides') their body. In this regard we discover circumstances within which ordinary spatial relationships *have* entered the body.

Rather than possessing the body as a 'given' to which sensation 'adheres' it appears that body image emerges from the relationship between sensation and the CNS. Given this the 'enveloping' to which Merleau-Ponty refers effectively occurs prior to the body image. If sensation is not something appended to the body 'External' sensation and proprioceptive perception by necessity will envelope each other as they are processed by the CNS generating our body image and sense of space.

Changes in Body Image

Our somatosensory system is known to be involved in more than just the perception of what we might consider to be our own sensations. When viewing the experience of others and imagining activities of various sorts the somatosensory and premotor cortices becomes active. Antonio Damasio describes the empathetic sensation of pain that we can experience as the "as-if-body-loop" mechanism.

It involves an internal brain simulation that consists of a rapid modification of ongoing body maps. (Antonio Damascio, *Looking for Spinoza,*Heinemann p 115)

However the notion of a body map is in itself problematic as Damascio points out

The result of the direct simulation of body states in body-sensing regions is no different from that of filtering of signals hailing from the body.... What one feels then is based on "false" construction, not on the "real" body state. (Ibid)

Damascio's use of scare quotes is appropriate because the sensation is real, what differs is that in that empathising with somebody who has grazed their knees although we've physically not gone through that event we experience it in another way. Similarly the experience of CRPS patients is real even though they apparently possess a 'normal' limb.

A condition that has similarities with CRPS is Fibromyalgia (FMS). The symptoms of FMS include widespread pain, hypersensitivity to sensory stimuli, phantom swelling of limbs and reduced sensitivity to the position of limbs and motor abnormalities such as tremors or slowness in movement.

In order to examine whether a dysfunction in the interaction between motor and sensory systems might be involved in symptoms experienced in FMS McCabe et al conducted a series of tests using a mirror/whiteboard that created varying degrees of sensory conflict during congruent/incongruent limb movements. The results of this were that 89.7% (26 out of 29) of patients with FMS involved in the tests reported changes in perception compared with 48% of a healthy control group. The sensations experienced included...

...disorientation, pain, perceived changes in temperature, limb weight or body image. Subjects described how these symptoms were similar to those they experienced in a "flare" of their FMS. This led us to conclude that some sensory disturbances in FMS may be perpetuated by a mismatch between motor output and sensory feedback.

Whilst it appears that this mismatch plays a role within FMS it was also the case that the healthy participants also reported (albeit at a lower incidence) changes in perception. Rather than being a phenomena exclusively linked to the pathology of FMS the results of these tests point towards what appears to be the emergent nature of body image as an a priori condition of perception. The anomalies that appear to exist within FMS therefore appear to make those who suffer from the condition all the more vulnerable to new anomalies. Given this it would appear that within CRPS such disturbances are exacerbated.

Given the close integration between (the enveloping) of body image and spatial perception it appears that conflicting sensation, proprioception and visual perception or faulty sensory integration might explain the experience of CRPS patients who have difficulty in locating their limbs or who feel that they are not a part of their body.

Communicating Painful Contradictions

The right side of my whole body actually feels quite normal, there no problem with that I don't have any difference in perception to what I see with that...

Because of the fact that CRPS is not well known diagnosis can often take some time. As was noted by one patient in our study

The thing I found difficult was getting this far, my GP knew nothing, so the diagnosis took forever...

During this period patients suffering from CRPS often doubt themselves because of the contradictory nature of their experiences.

A method currently used in assessing CRPS is the use of self portrait sketches or drawings made by clinicians; these have a number of limitations such as the ability of patients or staff to render these sensations. These are often revealing for those suffering from CRPS because it can often be the case that patients have not fully considered the nature of their sensation. It appears that they have often been trying to deal with the contradictions rather than 'inhabit' the sensations resulting from CRPS. One patient noted that

...its quite new to me because I hadn't really thought about this until I came in here.

This could be due to the nature of the sensations encountered...

I know there are fingers there and I even move them, I can't see fingers when I try closing my eyes to see it, I don't see anything, I just see a big blob

Inspiration for the development of a tool that would assist patients in communicating their symptoms came from Alexa Wright's *After Image* project which dealt with the experience of amputees and phantom limbs. Whilst Wright's work used Photoshop to manipulate photographic images of amputees this wasn't appropriate for the creation of a tool that could be easily used within a clinical setting. The spatial anomalies experienced CRPS patients also suggested that the development of a 3D tool would be more appropriate.

As a result of this a prototype tool was created that allowed the positioning, scaling and colouring of body parts to see whether this would aid patients in their description of their experiences. This was tested with patients suffering from CRPS who attending the Royal National Hospital for Rheumatic Diseases (RNHRD) in Bath.

Ethical clearance for the tests was of course required. One of our concerns was that in discussing their condition the level of pain experienced by patients often increases, as a result there were concerns that

use of the tool might negatively affect patients and so measures were put into place so that this could be addressed if it were to occur.

The tool was well received and considered to be a valuable improvement over established methods. What was interesting was that within the interviews that we conducted patients were asked if the experience of the tool was distressing for them in any way. In a number of instances increased pain was experienced but other benefits were expressed.

No, I don't think I've got a bad feeling from doing this, it's not a bad feeling it's just to me looking at that .... puts it into perspective what I've got its just I don't know how to explain it, it looks in human form exactly how I feel and I've never had that...

It was also the case that appeared that even if it hurt the process might have helped reconcile some of the contradictory sensations experienced by patients.

Patient: Seeing something and knowing that it's *your hand* is errm how can I put that into words, its erm, I don't know it I suppose accepting now that it's there, it's happened, I've got it..

 Interviewer: Does this help you accept it?

 Patient: *Yeah*, because you can see it...

Although the it was not something we sought to address through the use of the tool it is interesting to note that it may have benefits in the acceptance of the condition.

It wasn't that I disliked using it, it's just... for me as I say to visualise that how I feel I felt a bit emotional, but the more I'm looking at it, it's only because I'm sitting here thinking that is exactly how in my mind's eye what I look like so it was a bit of a shock I suppose.

The Nature of Pain

> You can't see pain

By its very nature the tool tended to focus upon the perception of the scale, position and possession of limbs. However the depiction of the quality of pain and the degree of contradiction often experienced within that pain was something that required further development.

My hand feels as if it's absolutely on fire and then if somebody touches it, it feels cold, and this pins and needles and I don't know how to represent that...

In fact these contradictions appear to be central to the nature of the pain experienced by many with CRPS.

These fingers here are numb, I suppose in a way they should be transparent really shouldn't they... 'cause these three fingers here are numb, I feel I could just stab them, but it's still got that hypersensitivity in it.

As a result of this we have now embarked upon the development of techniques that allow patients to approach a visual description of these sensations. However the sensation of 'pins and needles' described by one patient was, to varying degrees also reported by others.

Ok so the skin surface doesn't feel any different here, but when I've got my eyes closed it's very, it almost feels as if it's... if I say it's not there you know when you've sat on your foot and its gone to sleep, its that sort of feeling so you sort of know its there but if somebody said where is it its quite difficult to say it's just there...

In itself this provokes interesting questions concerning the issue of ownership of affected body parts... what if the pain is associated with a lack of sensation?

This opens up upon one of the therapies being used to minimise the pain suffered by those with CRPS. One of the emergent techniques used in treating CRPS concerns the sensory mapping of the affected region. It has been found that sensory retraining of the limb can reverse cortical changes and reduce pain.[3][4] Staff involved with the development of the Body Image tool are involved with the development of an Electrical Sensory Discrimination Therapy device (ESDT) that can improve sensory discrimination in the limb of healthy subjects and those with CRPS (funded by the NIHR[5]).

Conclusion

What does all of this mean for the electronic arts? For many years there has been a tendency to view the data of electronic systems as being akin to the idealism of Plato. The evidence of neuroplasticity and devices developed by scientists such as Bach-y-Rita has been used to support such claims. However as we have seen vision also plays a part in the somatosensory system; it may be the case that devices such as the BrainPort naturally play into this.

However as we have seen through our discussion of CRPS perception appears to be far more complex than a simple case of sensory input and neurological output. What we need to do is to begin to develop an understanding of the ways in which the somatosensory system works and the ways in which it participates in the generation of our body image. If we were to buy into the rhetoric of a digital realm of the ideal, any attempt to achieve the production of a body image in any other world seems fraught with potential problems. However it also the case that the digital can be used to realise images that reflect the realities of that system for those who suffer from conditions such as CRPS.

References and Notes:

1. *Beerthuizen A, van 't Spijker A, Huygen FJ, Klein J, de Wit R. "Is there an association between psychological factors and the Complex Regional Pain Syndrome type 1 (CRPS1) in adults? A systematic review." Pain 145 (2009) 52-59*
2. *McCabe CS, Cohen H, Hall J, Lewis J, Rodham K, Harris N "Somatosensory Conflicts in Complex Regional Pain Syndrome Type 1 and Fibromyalgia Syndrome."Current Rheumatology Reports 2009 Dec, 11 (6) 461-5*
3. *Flor H. "The Modification of cortical reorganisation and chronic pain by sensory feedback," Applied Psychophysiology and Biofeedback 2002; 27 (3):215-225*
4. *Pleger B, Tegenthoff M, Ragert P Förster A-F, Dinse HR, Schwenkreis P, Nicolas V, Maier C. "Sensorimotor returning in complex regional pain syndrome parallels pain reduction." Annals of Neurology 2005; 57(3):425-429*
5. *Harris ND, Mohan D, Pleydell-Pearce CW, McCabe C. "Improved sensory discrimination in healthy volunteers following electrosensory discrimination training." Clinical Rehabilitation 2010; 24 (3): 276-287*

ON BREATHING AND GEOGRAPHY – SONIFYING THE SEVERN AS SHARED GENERATIVE ART PRACTICE

MICHAELA PALMER

Using the example of a sonification prototype that explores the Severn estuary rhythms, this paper discusses possible frameworks for larger, multi-dimensional sonifications. It explores the necessary compromises between quantifying and qualifying data and argues that skillful use of sound compositional techniques, data mapping and participatory practices can deepen and intensify listeners' experiences.

Severn Bridge, 2010, Owain Jones, photographic media, Copyright Owain Jones.

The Severn Estuary in Southwest England (fig. 1) deserves great attention: with an enormous tidal range and three million people living around its shores, it is a unique site of interlinked and clashing rhythms. Moreover, the passage over or under the estuary, industry and tourism affects a much wider, and not necessarily local, population group. This is the target audience for Sonic Severn, [1] a small but growing online collection of soundscapes, sonifications and compositions about the Severn Estuary, curated by Tidal Severn.

Using the example of a more recent data-driven sonification prototype that explores the Severn estuary rhythms, this paper discusses possible frameworks for larger, multi-dimensional sonifications. It explores the necessary compromises between quantifying and qualifying data that can influence listeners' interpretation of sounds, and discusses different kinds of 'accuracies' that may be applied in the creation of sonic representations. These accuracies are often connected with listeners' perceptions of how they are connected with this landscape. It is argued that skillful use of sound compositional techniques, data mapping and participatory practices can deepen and intensify listeners' experiences of generative processes.

The sea's ebbs and flows, storms, swirls and stagnant waters have inspired many well-known compositions, such as Vivaldi's La Tempesta di Mare, Debussy's La Mer, or Vaughan Williams' Sea Symphony. Some of the rhythms of the sea can be especially well grasped in tidal landscapes such as the Severn estuary. But in addition to rhythmic changes, more intrinsic links between tidal landscapes and sound practices can be made. For example, plots of tidal ranges and plots generated by sound oscillators both exhibit typical sine wave structures. Coastal gauges calculate the tide height by mathematically eliminating wave heights, while in sound synthesis gauges limit the frequency range of signals. Tidal patterns are predicted via Fourier analysis – a method that examines fundamentals and their harmonics – while in sound practices Fourier analysis can be used for the generation of overtone-rich notes. Thus many of the methods used for the analysis of tidal processes are also applied in sound synthesis.

For a tidal sonification, exploring these commonalities may seem like a useful starting point, and yet such an approach overlooks the role of human experience. A landscape like the Severn estuary is not only read logically. Once immersed in it, sensations force themselves upon us: its unforgiving wind blasts the skin and makes the eyes water, its rain sticks sand grains to the skin; we smell and taste it. Before we know it, these sensations are shaped by our internal blueprints – memories, habits, cultural norms – and so we might start to think that the wind intentionally plays with our bodies, or that the estuary teases us with mudflats and quicksand pools. Interpreting what is around us is such a strong mechanism. It informs our habitual thinking patterns and shapes our expectations. When it fails, we tend to feel let down by the situation we encounter and less so by our expectations of it. Heading for a day out at the Severn beach for instance, we might be disappointed with the vacant scrubland we find but still not question what we hoped to see.

Indeed, habitual thinking patterns are hard to break. They can easily undermine the process of sound mapping itself. If we were to map the Severn estuary sediment for example, we would encounter the following problem: although the Severn estuary has one of the best-researched sedimentary regimes in the world, it is still difficult to pinpoint the sediment location. This is because the 30 million tons of fine silt that are suspended in the estuary's waters during a typical spring tide, are not equally distributed. There are areas of denser and less dense suspension, and some areas remain stationary (pools) while others move with the tides (slugs). [2] Moreover, the amount of moved material depends on the severity of each tide, which in turn influences the re-distribution of the landmass (erosion and deposition). Thus research – as well as first-hand observation – tells us that in this intertidal environment, a simple distinction between water and land is quite misplaced: land and water here permeate each other in very unpredictable ways. And yet, when thinking about the estuary, how easy it is to picture a map in our minds where a simple coastline separates land from water.

To arrive at a new mapping strategy for the estuary, one might therefore consider an artefact that literally redraws itself with each tide. Since the coastal shape would no longer be recognizable, the artefact could orientate its users via site-specific sound beacons instead, for example the sounds of the seagull colonies on Flatholm island. Beacons like this contain information not only about the physicality and materiality of a location, but also on the condition of the sounding objects embedded in them. Thus the use of real-time sound beacons can help to experience a landscape afresh. [3]

To move listeners between locations, this artefact would have an interactive interface. Listeners would only hear sounds within a certain range of their position, like one does on sound recording trips. This can encourage discovery via comparative listening, for example the discovery of different wave sounds caused by different bathometries: at Clevedon seafront for example one might hear small waves rushing

onto a pebble-covered bay, while at Burnham-on-Sea the wide-open sandy flats only produce occasional water ripples.

To further an understanding of the interdependence of the environmental processes in the estuary, this artefact also needs to become scalable. 'Zooming out' would enable synthetic listening (listening to the estuary as a whole), which in turn allows to make new connections between different sound events, for instance between the sonified lunar zenith and its following high tide, or between wind conditions and tide height.

While this new mapping strategy provides an outline for a developmental direction, Tidal Severn's current sonification prototype is still at a much earlier stage. At the moment it taps into three kinds of data: the level of tide over the mean sea level, weather data (wind speed, direction, atmospheric pressure) which influences the tide, and the solar-lunar constellation which also affects the tide. Since tidal data is multi-dimensional and human memory limited – our short-term memory can only hold about seven items of information at the same time [4] – data interpretation becomes increasingly difficult the more data streams are used; hence the limitation of the number of data streams.

These data streams were then mapped to groups of sounds. The key technique used hereby was parameter mapping, [5] which means that changes in numeric data values affect the attributes of sounds (such as onset, frequency, duration or amplitude). In parameter mapping, the relationship between sound and data can established as directly proportional (rising water level = rising pitch), scaled (rising water level = logarithmic rise of pitch) or otherwise mathematically defined. Thresholds, where the data indicates significant changes, can be acoustically marked, for example as flood warning sounds.

A known disadvantage of parameter mapping is that listeners need to understand the mapping strategy before they can understand the meaning of the changes in the sounds. [6] However, it was found that listeners needed less training if sound timbres were selected perceptually and applied consistently. Thus in the sonification prototype, sound metaphors (swelling and ebbing of sounds = swelling and ebbing of a water body) and self-labelling sounds (wind-like sounds = wind data) were used to allow for an intuitive attribution of sound to source. Moreover, the three sounds were acoustically grouped, each having distinct timbres (sound colours). The attributes of each group (pitch, duration etc) remained data-driven, but their timbres constant. This strategy seemed to aid comparative listening, as listeners noticed site-specific characteristics in the data more easily than when different mapping strategies were used.

Another finding was the influence of time compression on listeners' perception of the sounds. It is said we are more likely to pay attention to short sound events with a distinct change in dynamics (waves crashing into a seawall) but to ignore long drawn-out processes that show little change in rhythm or dynamics (a receding tide revealing mud flats). To explore this notion, the sonification prototype was tested with a number of time compression ratios. The data would no longer be sonified in real-time, but instead one tidal cycle's worth of data compressed into minutes. For many listeners the interrelations between the three sounds became more apparent when the data was scaled in such a way. Then listeners also seemed to become more sensitive to structured motion (rhythm) and were able to distinguish regular from unusual patterns more easily.

Indeed, if the Severn estuary rhythms were to be described by time classifications in music, the tide would fall into a 'macro timescale' of musical architecture or form, which according to Roads is measured in minutes, hours or days. [7] The tide in the estuary is duo-diurnal, which means that only after 12 hours or so it reaches the end of one basic unit of time (or beat). The relative positions of earth,

moon and sun on the other hand only repeat themselves every 19 years or so. This kind of rhythm corresponds to the 'supra timescale,' covering months, years, decades and centuries. [7] Since neither timescale connects to an everyday experience of duration, only an experienced observer would notice an unusual change, for instance in the monthly spring-neap cycle or the annual tidal cycle.

Weather patterns, on the other hand, fall within our everyday experience of duration, but since these are characterized by arrhythmic repetition – strong gusts of wind, or rainy days with sunny intervals are quite common in the estuary – it is not always obvious how the seemingly chaotic weather patterns relate to the seemingly regular tidal patterns. Thus a problem that affects real-time tidal sonifications is that since they do not coincide with habitual notions of duration, the cyclical nature of their rhythms may remain elusive to many listeners. On a deeper level, this leads to the question as to when artefacts that translate data into sound can actually be said to be successful.

To answer this, it is useful to turn to earlier days of sonification practice, when sonifications were defined as "the transformation of data relations into perceived relations in an acoustic signal for the purposes of facilitating communication or interpretation." [8] According to this, the aim of communication or interpretation should guide the sound mapping process. This has not lost any of is its validity, however, more recently it has been demanded that, at least within a scientific context, sonifications must also reflect objective relations in the input data, use systematic means to translate the data into sound, and should be set up in such a way that they are repeatable and reproducible. [9] What is often criticized nowadays about art-related sonification artefacts like the Severn prototype is that their algorithms are not made transparent, and so it remains unclear as to whether the sonification was carried out objectively and systematically.

In principle, this is a valid concern, yet the kind of objectivity called for is often hard to ascertain with the kind and quality of field data available. The Severn estuary is itself a part of a larger ecosystem, and so it is hard to define the boundaries of any of its data streams; for example the local weather conditions measured in the region are often the results of larger changes somewhere else in the system. It is important to understand this global link, but without limiting the data in some ways, characteristic local weather patterns may not be observable at all. A further complication is that most publically available scientific data is not updated in real-time. Tidal data for instance relies on – not completely accurate – predictions; and a weather station in Alveston that updates itself every 2.5 seconds is the nearest real-time data source in the area. Most other available data is time-delayed and/or somewhat coarse, only exposing its characteristic patterns with a degree of inaccuracy.

Objectivity is also hard to ascertain when the act of sonifying data already involves perception; at first in form of the researcher who maps data to sound, and then in form of listeners who re-interpret what they hear. Moreover, many data sources from the estuary represent vast numbers of very small elements. As humans we do not have an intuitive grasp of very large or very small numbers, and so it remains a challenge to successfully sonify, for example, 30 million tons of silt suspended in water. Since a directly proportional mapping of data to sound might not be adequate here, a more interpretative mapping strategy might be applied to aid communication. However, this already influences listeners' perception in a particular way.

But since the role of perception is so hard to exclude, it might be useful to integrate it more explicitly into the methodology. To this end, Lefebvre's Rhythmanalysis [10] provides a useful frame of reference, as it intrinsically connects the researcher's thoughts and experiences with the geographical location where the rhythmanalysis takes place. With references to musical rhythms as well as tidal rhythms,

Lefebvre's framework appears as particularly suitable for a sonification of the Severn estuary, yet its adoption is not entirely straightforward. For example, when Lefebvre introduces the notion of "lunar towns of the oceans," and "solar towns of the Mediterranean," [11] this may seem appropriate on some level; tidal rhythms are still engrained into the architecture of lunar cities and present in form of estuary-related professions. However, on another level, one might wonder about individual inhabitants' perceptions of the interplay of diurnal and lunar rhythms. Thus to allow for greater self-representation of those researched, a more participatory version of rhythmanalysis is required, one that can map the polyrhythmic exchanges that actually take place between estuary inhabitants and the landscape.

To this end, researchers like Biggs have pursued a deep mapping of a small number of estuary locations. [12] Deep mapping focuses on qualitative data, which is obtained through a collaborative process involving inhabitants and concerned parties. Although "in performance and archaeological circles in the UK, deep mapping refers primarily to site-based performances by Mike Pearson, Michael Shanks, Clifford McLucas, and the radical Welsh performance group *Brith Gof*," [13] deep mapping has been used much more widely. It can reveal radical perspectives, particularly when it abandons the traditional researcher-led perspective for collaborative methods and processes. A deep mapping that involves estuary residents would be able to map thoughts and issues in their complexity and, according to Biggs, challenge "distinctions between academic and artistic outcomes, between healing fictions and scholarly critique, between amateurs and professionals." [13]

For an artefact that successfully sonifies Severn estuary rhythms, it seems, participatory practices like deep mapping need to be used alongside established data communication methods. In this way, intuitive connections between observed tidal phenomena and their experience can more easily be made. Moreover, creating the possibility of moving between measuring and sensing, between different time and map scales involves listeners cognitively as well as emotionally. As Lefebvre remarked, this can open the door to new insights:

Our scale determines our location, our place in the space-time of the universe: what we perceive of it and what serves as a point of departure for practice, as for theoretical knowledge. […] Another scale would determine another world. The same? Without doubt, but differently grasped. [14]

And since, according to Lefebvre, it should be possible to connect with complex natural phenomena more deeply when we can relate them to our own bodily rhythms, the following may serve as a concluding thought experiment: It takes the duration of about 12000 human in and outbreaths for the Severn estuary to complete one tidal cycle. Counting thousands of breaths in order to grasp the nature of the tide is however simply unbearable, as the difference between the two durational scales is too great. But when we mentally switch scales, an intuitive connection can quickly be made: by observing how, like the tide, each breath unfolds slightly differently each time; how it naturally accelerates, decelerates, pauses and turns direction.

Dr Michaela Palmer and Dr Owain Jones are Tidal Severn, an interdisciplinary research team that provides information, teaching materials and presentations in order to raise public awareness about the Severn Estuary, a large and important intertidal landscape in Southwest England.

Sonic Severn is open to composers, sound designers and sound artists who wish to work with some of the phenomena of the Severn Estuary, in order to share what is in living memory and to open listeners' minds to the fragile relationships between human experience and local landscape.

References and Notes:

1. *Sonic Severn's official Web Site, http://www.sonicsevern.co.uk (accessed May 30, 2011).*
2. *R. Kirby, "The Fine Sediment Regime of the Severn Estuary," Severn Estuary Gateway, April 2008, http://www.severnestuary.net/sep/pdfs/ecsa/19rkirby.pdf (accessed June 30, 2011).*
3. *W. W. Gaver, "How Do we Hear in the World?" in Ecological Psychology 5, no. 4 (1993): 285-313.*
4. *C. Scaletti, "Sound Synthesis Algorithms for Auditory Data Representations" in Auditory Display, ed. G. Kramer, 223-253 (Boston, MA: Addison-Wesley, 1994).*
5. *G. A. Miller, "The Magical Number Seven, Plus or Minus Two," in Psychological Review 63, no. 2 (1956): 81-97.*
6. *T. Hermann and H. Ritter, "Sound and Meaning in Auditory Data Display," ed. G. Johannsen, special issue, Proceedings of the IEEE 92, no. 4 (2004): 730-741.*
7. *C. Roads, Microsound (Cambridge, MA: The MIT Press, 2001), 3-4.*
8. *G. Kramer et al., "Sonification Report," ICAD's official Web Site, 1999, http://www.icad.org/node/400 (accessed August 31, 2011)*
9. *T. Hermann, "Taxonomy and Definitions for Sonification and Auditory Display," ICAD's official Web Site, 2008, http://www.icad.org/node/2352 (accessed August 30, 2011).*
10. *H. Lefebvre, Rhythmanalysis (London: Continuum, 2004).*
11. *Ibid., 91*
12. *I. Biggs, "Deep Mapping," in Mapping Spectral Traces, ed. K. E. Till (UK: CMP Ltd, 2010), 5-8.*
13. *Ibid., 5-6.*
14. *H. Lefebvre, Rhythmanalysis (London: Continuum, 2004): 82-83.*

WAKEFUL SOFTWARE AND WAKEFUL MUSICAL INSTRUMENTS: A THEORETICAL APPROACH TO THE IMPLEMENTATION

Fabio Paolizzo

A new category of content-related software is here proposed. 'Wakeful' software is one that senses and responds to an environment with which it may consistently interact meaningfully. The term 'wakeful' is here meant as 'sign-bearing,' in relation to the potential of computers and human beings to interact in terms of sign exchange.

The present proposal is based on concepts that interest any human-computer interaction that involves the generation or manipulation of content of any type. Specifically, the study was carried out in relation to music and computer-based interactive musical systems. Accordingly, the research offers definitions of both 'wakeful software' and of 'wakeful musical instruments,' which are particular types of computer programs and of interactive musical systems. In interactive music, the reasons why users and audiences can only occasionally interpret the sonic constructs as music, which an interactive system generates, are often obscure. The present study is part of a larger project that aims at defining a protocol for living being-machine interaction, in order to guarantee consistency of communication between these types of agents. Currently, the solution to such crucial problems as the above is being urgently sought in diverse fields of study, from computer science to philosophy of mind. Wakeful software is one, which respects such a protocol.

First of all, we shall give a definition of an 'interactive music system'. Robert Rowe described such systems as "those whose behaviour changes in response to musical input." (Rowe, 2001) On the other hand, a definition of 'wakefulness' implies a comprehension of what consciousness is; an umbrella term that has many different meanings and about whose fundamental characteristics there is no consensus. According to the Stanford Encyclopedia of Philosophy, while it is possible to understand consciousness as a mental state, an animal, person or other cognitive system may be conscious in the sense that they constitute forms of consciousness; they are conscious cognitive systems. In this specific regard, consciousness may be firstly identified as sentience or wakefulness. While sentience is the capability of any organism to sense and respond to its world (i.e. any living being), an organism is wakeful only when actually using such a capacity (i.e. a comatose living being might not be 'wakeful'). In both forms, the concept of 'response,' recalled by the definition, implicitly points at an act of communication, which may eventually or actually take place, between the cognitive system and the environment. The English term communication derives from Latin verb 'communicare' (to share). As pointed out by Dan J. Rothwell, a necessary condition, for a communication to be established, is that the communicating parties share a common environment of communication; they need to be capable of a similar interpretation of the messages being exchanged.

In relation to the focus of the study, the first question arises: do computers and human beings share such a communicative commonality? The present research will show that although they do not, specific techniques can be adopted for machines to simulate logics of communication, which are proper to living

beings. Such techniques may allow any human agent to consider the responses of content-related software, as either an act of real communication or a convincing simulation, to which attribute meaning. While sentience and wakefulness constitute relatively simple forms of consciousness, human beings and possibly other cognitive systems are more sophisticated; they are forms of self-consciousness. Creatures or cognitive systems, to be considered as such, need to be more than sentient and wakeful; according to the Stanford Encyclopedia of Philosophy, they are those which "are not only aware, but also aware that they are aware." A question, which has been formulated already many times, arises here again: can a computer be conscious?

In interactive software of any kind, the concept of agency is central. A peculiar relation exists between agency and consciousness. What is the nature of this relation and how is it possible to mean consciousness in relation to agency? Is any agent conscious? Interaction between human agent and machine occurs within what is called a multimodal ambient, where agents interact with each other by different modes (i.e. as in the planet Earth). In very general terms, agency can be defined as the capacity of an agent to act in a world. However, agency differs for intelligent and non-intelligent agents. For instance, there is general agreement that human beings are intelligent agents, who are able to make choices and to enact those choices on the world. Instead, natural forces are considered to be causes that involve only unthinking deterministic processes. In this simpler form of natural phenomena, agency seems to imply only the capacity to act in an environment. However, even excluding the Gaia theory, agency often exceeds the mere capacity of action; it implies a relationship which is connoted by a decisional nature that may help to clarify the distinction between intelligent and non-intelligent agents. The English word agency derives from the Latin 'agere' (to do): an agreement to act on one's behalf. Such 'action on behalf of' implies the authority to decide which action is appropriate. According to the Encyclopædia Britannica, "in computer science, an agent is a computer program that performs various actions continuously and autonomously on behalf of an individual or an organization." The authority of taking appropriate decisions is a capacity that cannot be simply described as deterministic, and leads us to discuss the subject of how human beings come to make decisions.

According to Thomas Nagel, a being is conscious just if there is a subjective way, a mode of consciousness that constitutes the creature's mental or experiential point of view. For Nagel, bats are conscious because there is 'something that it is like' for a bat to experience its world through its echo-locator senses. While a software agent is not a living creature, indeed certain software agents may be actually capable of sensing and responding to the environment. In which case, it makes sense to pose the question: 'what is it like to be a software agent?' May such agents be considered as conscious? Taking into account the above mentioned diverse forms of consciousness, software agents should be considered as capable both of sentience and wakefulness. However, can they be considered as forms of self-consciousness? Can they be aware of being aware? In order to progress toward the formulation of an answer to such a question, we will introduce few concepts from biosemiotics.

The Oxford Dictionary of Biochemistry and Molecular Biology defines biosemiotics as "the study of signs, of communication, and of information in living organisms." This term derives from the Greek 'bios' (life) and 'semeion' (sign). In biosemiotics, "signification (and sign) is understood in a very general sense, that is, not simply the transfer of information from one place to another, but the generation of the very content and meaning of that information in human as well as non-human sign producers and sign receivers." (Emmeche and Kull, 2011) This principle was described in different terms by the Nobel prizes Ernst Mayr and Manfred Eigen as the peculiarity of living forms and possibly, of man-made computers. However, computers are designed by humans to achieve specific goals; their teleology is derived. Instead, the informational characteristics of organisms evolved through adaptation and the same living

forms are the result of an evolution. While software agent can adapt to the world that they sense, as living beings do, for a computer such a process operates within a scenario that is to some extent prede-termined by its designer. Nevertheless, two further observations can be made: in humans, the informa-tional processes resulting from adaptation and self-adaptation are similar to each other; the informa-tional processes by which humans and computers interact and adapt to the environment denote similar traits.

The necessary condition for self-adaptation to occur is that the mind – or whatever entity or organ may constitute the 'mind,' as we are considering the eventuality of self-conscious cognitive systems that do not have 'minds,' – needs to be attributing meanings to the perceived signs; a process of interpretation may have to take place. Interpretation is the process of attribution of meaning by which signs take shape in the mind. Any interpretation is always a bi-directional and recursive loop, since whereas the mind assigns a meaning to the sign, the sign itself is connoting the mind. This process, fundamental to forms of self-consciousness, is virtually open-ended, being the result of a recursive process of interpreta-tion. Finally, we can now refine our question: are computers capable of interpretation?

Lending to the present investigation a few of the conceptual fundaments of biosemiotics, it is possible to describe interactions in a multimodal ambient as recursive sign exchanges occurring between agents, whereas such an ambient includes agents capable of interpretation. We shall clarify such a statement. There is a strict relation between an interaction and an interpretation process, interpretation being a form of mental interaction between thoughts and information retrieved from the external phenomeno-logical reality. Therefore, interpretation maintains an interesting relation to the concept of agency. While internally representing reality, the mind does not operate 'on behalf' of reality; signs cannot be considered as agents, as they do not intentionally act, but instead are being acted on by the mind. Still, the character of intentionality, denoting the interpreting mind, is not only recursively self-fuelled but self-aimed. Hans-George Gadamer rethought "the traditional concept of hermeneutics as necessarily involving, not merely explication, but also application. In this respect, all interpretation, even of the past, is necessarily 'prejudgmental' in the sense that it is always oriented to present concerns and interests." (Malpas, 2009) We previously defined computers as inscribed within a derived teleology. Having now highlighted self-aimed intentionality as the peculiarity of interpretation, we have evidence that comput-ers are not capable of interpretation. However, it still makes sense to further investigate the analogies between human and machine cognition, as they appear to root into a similar dynamic of interaction.

In biosemiotics terms, "a sign is not the same thing as a piece of information. It is related to information but only becomes 'information' through an act of interpretation." (Hoffmeyer, 2008) In the mind, each of the perceived signs evokes an entire net of concepts. When trying to explain and apply present con-cerns and interests to current experience, all the concepts thus educed interact. Not only do the con-cepts recalled by a certain sign interact with concepts afferent to a different one, but signs and concepts actually affect each other, and as concepts change, so do the related signs. Forms of self-consciousness operate an open-ended process of redefining both themselves and their world of signs; their interaction is populated by signs that affect concepts, which in turn affect other signs and concepts. Finally, we can state that interpretation exceeds the self-contained teleology of what computers are today, as from their 'what it is like' perspectives signs do not exist, only information about their own current state does it. Unsurprisingly, current computers are not forms of self-consciousness. Nevertheless, these implica-tions will help us in defining what both wakeful software and wakeful musical instruments are.

In Rowe's definition of an interactive musical system, the term 'musical' exceeds the mere sonic phe-nomenon, as music is the result of an interpretation. In such a system, the presence of an interpreting

agent is implicit. For convenience, we shall use the following definition: 'an interactive musical system is one whose behaviour changes in response to inputs, which at least one interpreting agent recognizes as musical.' Will such an agent also consistently consider the system responses as being musical? Within art projects, in the present research, both users and audiences experiencing interactive music were frequently unable to interpret the sonic constructs, generated by such a system, as music. While computers treat the received stimuli as information, biological agents interpret such information as a network of signs. Such a discrepancy actually constitutes a structural obstruction, for living beings, in attributing meaning to actions or constructs that are generated by computers.

A step forward in finding a solution to this problem can be taken by considering biocommunication theory, which frames the interactions between subjects of the same species or between subjects of different species in terms of sign-exchanges occurring within a shared communicative commonality. "Intersubjective interactions are characterised by reciprocal validity claims. To speak, make propositions and understand utterances does not function through private encoding process and subsequently a private decoding process, but a shared rule-governed sign-mediated reciprocal interaction. The shared competence of semiotic rules and the socialised linguistic competence to build correct sentences enable the interaction partners to understand identical meaning of utterances." (Witzany, 2010) In order to circumvent the gap that we described above, the present study identifies specific structures of interrelation for living biological organism-machine interaction. These structures are defined as 'bio-logics'; logics that mimic the informational mechanisms of living beings. These bio-logics are implemented as computer algorithms to improve such interactions. Without being recalled in such a way, these structures were nevertheless frequently adopted in computer science. Similarly, interactive software often incorporated these types of algorithms. The present research recognizes that such structures and instruments belong to the categories that we are here defining. However, their cataloguing exceeds our scope, which is instead to highlight the consistent significance of such theories and to offer classification of their nature, as a protocol for designing such interactivity; a set of procedures to be followed in designing living being-machine interaction.

Among the bio-logics, the present paper proposes salience to enable human beings to consistently attribute meaning to actions operated by a computer or to constructs that it generates, which they might not otherwise consider to be coherent signs within the context. Usage and improvement of salience-based mechanisms has recently been the focus of consistent research (i.e. as in the EPSRC project, aka Salience project), which offered the chance to successfully adopt such techniques for better modelling of cognition in computing. The Oxford English Dictionary defines the adjective 'salient' as 'most noticeable or important' and similarly, the psychologist William Crano identified salience, as a factor that informs the awareness of the perceiving subject about the effects of an attitude upon himself/herself. An interpreting agent selects salient information, in virtue of the self-aimed, explanatory and applicative character of interpretation itself and attributes a meaning to such information, identifying it as a sign. In the constructs or actions produced by computer programs, whereas the morphologies reflect salience, interpreting agents may notice such a salience and therefore, recognize the information as a sign.

Therefore, software can be descried as wakeful, when sensing and responding in its multimodal ambient by defining salient morphologies to which living beings can attribute meaning, within the specific context. Such an attribution of meaning is actually consistent and not only occasional, as a communicative commonality is granted to these computers and living beings by the implementation of bio-logics. In such a framework, bio-logical algorithms format the information, as signs recognizable by living beings. Obviously, such a translation is only a simulation of an authentic process of interpretation. Still, regardless of whether the interpreting agents consider the machine to be a form of sentience, wakefulness,

self-consciousness, or just a convincing simulation, an act of communication can be actually established to a certain extent.

In communication, the resemblance of authenticity may be a valid surrogate for the real thing, as sets the necessary conditions for an eventual communication to actually occur; living beings recognize in salient interactions a logic that is proper to any life form. Alongside the approach offered by biocommunication theory, it is similarly possible to recall and extend Nagel's perspective in a direction offered by simulation theory, by which "human competence in predicting and explaining behaviour depends chiefly on a capacity for mental simulation." (Gordon, 1992) This theory deeply roots into the human capacity for empathy between subjects and "involves the imaginative method of projecting first personal experience, to achieve imaginative acquaintance with what it's like for the other." (Holton & Langton, 1998) In one of its latest formulations, simulation theory necessarily involves introspection, following the generation of a mental upshot for "detecting or determining the nature or character of that upshot." (Goldman, 2011) In humans, both a default tendency to empathy and a state of self-awareness are usually present. From one hand, an empathic feeling such as identification and eventually, even compassion, may arise after having recognized, in the interacting party, a characteristic that could denote life to a lower or higher degree: from unpredictability to reactivity, vulnerability, intentionality, or eventually, even humour. From the other hand, human beings may expose such characteristics when they do not imply intentionality, because of their sophisticated capacity of interpreting. Nevertheless, for humans, and possibly to a similar extent, for other living beings capable of self-consciousness, a simulation of intentionality may be more convincing, when it allows those to identify the trace of a sign within it. Forms of self-consciousness share an understanding of their world based on their subjective, experiential and only way to comprehend, and being aware of such an act. In direct proportion to the communicative commonality that they are sharing, these sophisticated living beings can consistently 'biocommunicate' its interpretation to each other, distinguishing between intentionality and a deterministic process. Sign exchanges constitute their mode of interacting (and communicating) within the multimodal ambient that they live in. Nevertheless, identifying within the responses of a computer a certain degree of intentionality, for however simulated and predetermined that can be, still may engage the interpreting agents into a convincing conversation with such a computer.

Any wakeful software is more than interactive, as it is more than sentient. It does not only have the capacity to eventually sense and respond; it can actually apply such a capacity in the mode in which the interpreting agents, populating its environment, interact. Such an instrument is wakeful, in the sense that those agents may repeatedly recognize its responses, as such. As content-related interactions involve the interpreting agents to interact in terms of sign exchange, wakeful software interacts with such an environment, in such terms. It is 'one that senses and responds to an environment with which it consistently interacts meaningfully.' Specifically for music, in play with a wakeful musical instrument, both user and audience may identify the generated sonic responses as salient information, which they may therefore interpret as a musical signs; for them, the interaction of the system is consistently musically meaningful. A wakeful musical instrument may be similarly defined as 'one that senses and responds to a musical environment with which it consistently interacts in a musical meaningful manner.'

References and Notes:

C. Emmeche, K. Kull, "Biosemiotics," Semiosis Evolution Energy, http://www.library.utoronto.ca/see/pages/biosemioticsdef.html (accessed October 22, 2011).

R. Gordon, "The Simulation Theory: Objections and Misconceptions," in Mind & Language, no.7 (1992): 11–34.

A. I. Goldman, K. Shanton, "The case for Simulation Theory," to appear in Handbook of Theory of Mind, eds. A. Leslie and T. German (Psychology Press), http://www.nyu.edu/gsas/dept/philo/faculty/block/M&L2010/Papers/Goldman.pdf (accessed October 22, 2011).

J. Hoffmeyer, "Biosemiotics. An Examination into the Signs of Life and the Life of Signs," J. Hoffmeyer's Site, 2008, http://web.mac.com/jhoffmeyer/Jespers_Site/New_Book:_Biosemiotics.html (accessed October 22, 2011).

R. Holton, R. Langton, "Empathy and Animal Ethics," in Singer and His Critics, ed. D. Jamieson, 209–232 (Oxford: Blackwell Publishers, 1998).

J. Malpas, "Hans-Georg Gadamer," Stanford Encyclopedia of Philosophy, 2009, http://plato.stanford.edu/entries/gadamer/ (accessed October 22, 2011).

J. Queiroz, C. Emmeche, K. Kull, C. El-Hani, "The biosemiotics approach in biology: theoretical bases and applied model," in Information and Living Systems: Philosophical and Scientific Perspectives, eds. G. Terzis, R. Arp (Cambridge: MIT Press, 2011), 91–130.

R. Rowe, Interactive Music Systems (Cambridge: MIT Press, 1993), 1.

MOBILITY INTO IMMOBILITY: DESIGNING NETWORKS

Luisa Paraguai

The text is concerned with the networks and flows of information and bodies, discussing other perceptions and movements to perform our everyday life and to comprehend the world. At the end, INmobility, an artwork in progress, is presented and concerns with the mobile technologies as other possibilities of people being temporarily "on the move", questioning physical and temporal domains to propose narratives.

Fig 1. Visual narrative 1, 2011, Luisa Paraguai, photographic media.

Fig 2. Visual narrative 2, 2011, Luisa Paraguai, photographic media.

Fig 3. Visual narrative 3, 2011, Luisa Paraguai, photographic media.

The text is concerned with networks and flows of information and bodies, discussing other perceptions and configurations of movements to perform our everyday life, and so, to perceive and comprehend the world. "Movements often involves an embodied experience of the material and social modes of dwelling-in-motion," [1] and we have sewing those organizations and systems upon physical and informational – data networks. Then, the reality can be understood as a negotiation process among different actual events, according to distinct protocols of communication and networks; it means the reality is understood as a dynamic process of flows.

Firstly, the people, technologies and space relationships are explored as possibilities of connections among different networks – as movements in physical spaces and/or as communication processes in digital and radio protocols. At the end, the project INmobility presented is concerned with the idea of technology as an agent to evoke other narrative dimensions to deal with the space and time, revealing different perspectives of reading and understanding the world.

Networks: Topologies Defined by Connections

Mobile communication, evoking characteristic ubiquity and accessibility, has permeated all domains of our everyday life. People have moved around actualizing different networks, physical locations and data nodes configuring a complex structure, programmed and self-configurable at the same time. "The diffusion of Internet, wireless communication, digital media and a variety of tools of social software has prompted the development of horizontal networks of interactive communication that connect local and global in chosen time." [2] People have faced different patterns of arrangements, juxtaposed and superposed, trying to transcend the dominant logic of each network and to establish common and collaborative procedures. "Flows are streams of information between nodes, circulating through the channels of connection between nodes." [3]

The mediated communication devices have configured a hybrid mode of existence, juxtaposing digital and physical domains simultaneously. That concept of hybrid space as a formal structure of those interconnections – visible configuration, has been considered quite important to apprehend the symbolic

and aesthetic perspectives of the reality. "The expression of social relationships, ultimately power relationships, that underlie the evolution of the multimodal communication system." [4] The cultural dimension of that process, as a multilayered transformation of communication, can be defined by synchronic connections among several networks, with different protocols of communication; it means we have experienced the tension between the parallel development of a global culture and multiple local identities. We have to renegotiate space-time organizations as models of circulating in the world; it means we have to deal with different protocols of communication simultaneously as 'to be on the move' – to operate and produce within in-between spaces and times.

"Territorial behavior is a self–other boundary regulation mechanism that involves personalization of or marking of a place or object and communication that it is 'owned' by a person or a group." [5] Nowadays, we have related to different forms of information systems – radio channels, mobile calls, GPS info, emails, text messages, skype sessions, facebook posts, twitter comments – tracing and tracking objects, locations and people. A specific perceptive and cognitive condition has addressed bodies-with-environments – physical and digital, to a specific set of performances. It means others within that system have known each person or object. Such systems, named as "flow architectures" [6] and "network society," [7] have distributed economies, peoples, objects and activities, across the world. Their social structure is made up of networks that are powered by microelectronics-based information and communication technologies, improving on the characteristics of flexibility, scalability and portability. The apparently different domains of work, family, and social life becoming more networked, more similar to each other and more interdependent.

What is specific to our world is the extension and augmentation of the body and mind of human subjects in networks of interactions powered by micro-electronics-based, software-operated, communication technologies. These technologies are increasingly diffused throughout the entire realm of human activity by growing miniaturization and we may add portability. [8]

Technological and social organizational convergence has taken place between physical and technological systems and gradually has formed a new ambient, in which the ability to connect from wireless devices has become the predominant form of communication. The project INmobility is concerned with the meaning of materiality and those artefacts through the roles they play in different territorial networks. "In a world of networks, the ability to exercise control over others depends on two basic mechanisms: the ability to constitute networks, and to program/reprogram the networks in terms of the goals assigned to the networks; and the ability to connect and ensure the cooperation of different networks by sharing common goals and combining resources, while fending off competition from other networks by setting up strategic cooperation." [9]

The main characteristic of wireless communication is not physical mobility but constant access and communication; it takes place because of the Internet potential structure of operation: a distributed network that has the possibility of combining distinct horizontal structures. Then, the mobile interfaces have connected those communication systems, not related and based on the Internet network protocol. It is a multimodal, "[…] also self-generated in content, self-directed in emission, and self-selected in reception by many who communicate with many" – "a mass self-communication." [10]

We can stand a spatial structure that dynamically adapts to the communicational demands and necessities from own nodes; it means, for each new connection the network topology can be modified based on the existence of their nodes/users' mobile phone and their abilities for communication. The attempt to comprehend and incorporate that operational network structure is to formalize a social shared space

as zones of fluxes, and not determined spaces of information distribution. Nowadays, it is necessary to comprehend mobility as the ability to move between different networks – physical and digital communication systems – that have as many dimensions as interconnections.

Automobility and Time-Space Relationships

The first attempt to reorganize public and social, spaces and accesses was made by the cars, extending where people could go to and hence what they are literally able to do. They set others flexible social patterns of commuting, family life, community, leisure, and the pleasures of movements and so on. "Machine space, or territory devoted primarily to the use of machines, shall be so designated when machines have priority over people in the use of territory. Automobile territory in modern American cities exemplifies the concept of machine space." [11]

The car has reorganized in complex and heterogeneous ways the mobilities and socialities across significant distances and moments; it has created spatially stretched and time-compressed modes of people's moving and being encapsulated in a personal, cocooned, moving capsule – a bubble. "I suggest that there have been four characteristics modes of dwelling with regard to the car, what I term 'inhabiting-unmade-roads', 'inhabiting-the-paved-road', 'inhabiting-the-car', and 'inhabiting-the-intelligent-car'." [12] At first, the cars were open, not separated from the around sights, smells, and sounds – presented as the regular basis of commuting or even social life; in the second stage, the important was the tour than the destination – the performance of motor touring, the machine; in the third stage, the driver became a passive observer of the world, passing through the window – a refuge, a mobile privatization, in which the driver's body became fragmented and disciplined to the machine. The car can be thought as an extension of the senses so that the driver can feel its very contours, shape and relationship to that beyond its metallic skin. It is an everyday object and becomes a place to behave in a particular way in which, nowadays, people can organize a series of multiple activities, connecting to distant others through internet, mobile phone or radio.

"The car becomes a symbiotic extension of the driver own embodiedness." [13] Automobility cannot divide spaces clearly – as work and home, leisure and work; it has produced lengthy commutes into and across the city. Then, cars have become a contemporaneous device, organizing possible complex models of social and cultural organizational structures to approach the urban landscape. Import us, the current instantaneous time involving the resynchronizations of the existent time-space paths. A shift to an individualistic timetabling of many moments or fragments of time – a personal clock-time upon the public timetable every time we drive. People have tried to sustain "coherent biographical narratives in the context of multiple choices filtered through abstract systems," [14] and the project INmobility is an attempt to register those images and sounds.

The flexibility of movements is modeled by the temporal instance, producing multiple activities, spatially desynchronized from each other but integrated. It means, the traffic is a repetitive order of things independent of drivers whose actions compose it. People try to structure complex, fragile and contingent patterns of social life – self-created narratives – juggling fragments of time and activities. A network of individuals is connected through similarity of actions and intentions, and totally dependent on a social order.

"The difficulty we have in defining all associations in terms of networks is due to the prevalence of geography. It seems obvious that we can oppose proximity and connections. However, geographical proximity is the result of a science, geography, of a profession, geographers, of a practice, mapping system, measuring, triangulating. … All definitions in terms of surface and territories come from our reading of maps drawn and filled in by geographers. Out of geographers and geography, 'in between' there own networks, there is no such a thing as proximity or a distance, which would not be defined by connectibility. The geographical notion is simply another connection to a grid defining a metrics and a scale. The notion of network helps us to lift the tyranny of geographers in defining space and offers us a notion which is neither social nor 'real' space, but simply associations." [15]

INmobility: Texts and Textures of Everyday Life

People have performed their everyday life in metropolitan areas while organize constant attempts of virtualising the space-time relationship. In that text, we have brought the terms networks, cars and communication systems together to configure visual experience maps of moving as a collaborative and multitasking platform. The space and time relationships have been discussed articulating different protocols of communication and modes of distribution not coordinated. The INmobility project is concerned with the visibility of those temporary social networks, physical and digital, juxtaposed by synchronous live messages; the proposal of the narratives produced is to visualize our daily actions as dynamic collaborative networks.

Motion and emotion – the car was taken as a place to exercise the subjectivity, a private bubble in which experiences are released in unacceptable forms and gestures; it is understood as an enclosed space of control, inhabited in different ways and able to evoke new behaviors and gestures. Those body movements are understood as a polysemic representation affecting ways of sociability, formal and informal attitudes. Central to dwelling the car is the soundscape – different technologies can create sound spaces that are occupied by voices, music, sounds, and dialogues. Nowadays, the mobile technologies have proposed to the users other connections not proximal – from the intimate condition of driving to a participative way, to create their everyday routes.

Mobile technologies have set other possibilities of people being temporarily 'on the move', creating gaps and holes, other dimensions and domains. The ability of using those devices has demanded from users to comprehend and accommodate technologies on time and space. The 'nine to five' culture, in big cities as São Paulo, using mobile and GPS devices, can engender interspaces and reorganize physical arrangements, intertwining different space and time models. Audio and images narratives (figure 1, figure 2, figure 3) have been experimented, trying to track distinct networks and to map distinct social activities. The window and mirror images are explored as modes of recognition and presentation to others. Other perspectives and angles evoke a "fluid choreography," [16] but still suggest an effective private space. From those visual narratives we can exercise parallel dimensions and to question the feeling of belonging to those urban spaces.

Fig. 1. Visual narrative 1, 2011, Luisa Paraguai, photographic media. (Used with permission.)

Fig. 2. Visual narrative 2, 2011, Luisa Paraguai, photographic media. (Used with permission.)

Fig. 3. Visual narrative 3, 2011, Luisa Paraguai, photographic media. (Used with permission.)

From the project we want to comprehend the tension between distinct materialities of the space and time relationship simultaneously operated by people through mobile devices. The intrinsic operational mode of the networks that conforms some informational patterns – computational and bodily, electromagnetic and spatial, has dislocated the usual understanding of shapes and spaces to propose other articulations. The blurred limits and the possibility of compounding physical spaces and informational contexts have evoked other dimensions for people's interaction; the audiovisual narratives proposed have pointed out the mediated practices to create particular perspectives of those specific spaces. The perception and action relationship has presented itself as a phenomenological experience in which the individual, car and the ambient are included by media.

References and Notes:

1. *John Urry, Mobilities (Cambridge: Polity, 2007), 11.*
2. *Manuel Castells, Communication Power (New York: Oxford University, 2009), 65.*
3. *Ibid., 20.*
4. *Ibid., 57.*
5. *Irwin Altman, The Environment and Social Behaviour (Monterey: Brooks/Cole, 1975), 107.*
6. *Knorr K. Cetina, "From Pipes to Scopes: The Flow Architecture of Financial Markets," Distinktion 7 (2003): 7-23.*
7. *Manuel Castells, A Era da Informação: Economia, Sociedade e Cultura (São Paulo: Paz e Terra, 1999).*
8. *Manuel Castells, ed., The network Society: A Cross-Cultural Perspective (Cheltenham: Edward Elgar, 2004), 7.*
9. *Manuel Castells, Communication Power (New York: Oxford University, 2009), 45.*
10. *Ibid., 70.*
11. *Ronald Horvath, "Machine Space," in The Geographical Review 64, no. 2 (1974): 167-188.*
12. *John Urry, Mobilities (Cambridge: Polity, 2007), 124-128.*
13. *Don Ihde, "The Experience of Technology: Human-Machine Relations," Cultural Hermeneutics 2 (1974): 267-279.*
14. *Anthony Giddens, Modernity and Self-Identity (Cambridge: Polity, 1991), 6.*
15. *Bruno Latour, "The Trouble with Actor-Network Theory," in Danish Philosophy Journal 25, no. 3-4 (1997): 47-64.*
16. *Mike Featherstone, Nigel Thrift and John Urry, Automobilities (London: SAGE, 2005), 8.*

DIRECT TO VIDEO: STEPHEN BECK'S CAMERALESS TELEVISION

KRIS PAULSEN

This paper examines Stephen Beck's cameraless video synthesizers of the 1970s. Rather than using video as a camera-based mimetic medium, Beck directly manipulated the basic component of video – the electron. Video Synthesizers, I argue, propose an alternative understanding of video and its essential qualities. Synthetic video grounds itself in the materiality of the screen rather than the transparency of the image.

Fig 1. Stephen Beck at the Beck Direct Video Synthesizer, 1971, Stephen Beck, Digital image scan from original monochrome photograph, Copyright Stephen Beck.

Fig 2. Photograph of Two Video Weavings Still Frames, 1973, Stephen Beck, Video stills, Copyright Stephen Beck.

A live video camera pointed at its own monitor creates a vertiginous hall of mirrors in its feedback loop. The distance between the lens and the screen is simultaneously flattened and extended toward an ever-receding and ever-repeating horizon. The apparently automatic, realist codes of the video camera turn suddenly surreal by exploiting an inherent effect of the live medium. If one then tilts the camera, this loosened hold on representation slips completely away into dazzling abstraction. The monitor displays a dutched image of itself, but this image still contains in its echo the previous one – that of the upright monitor – and a temporal record of the movement. The image of a monitor turned perpendicularly in its own frame will swirl under the pulsating pressure of feedback. By slightly tampering with the aperture of the camera, the contrast, brightness, or focal distance one can completely divorce the image from any sign of reality. It pulls from the corners of the screen, and reconfigures into a tumbling pinwheel that grows more and more complex over time, creating morphing "mandalas" of electrons on the surface of the screen. These shapes, though free from the compulsive representation of the camera, are the "archetypical" [1] images of the video medium.

This live feed "mandala" effect is a simple means of divorcing the video camera and screen from the iconic and representational codes that usually govern it. Nam June Paik and Shua Abe exploited this and other effects to create their first video synthesizer at WGBH-Boston in 1969. Like Paik's earliest television works, the Paik-Abe Synthesizer worked upon other images rather than literally synthesizing its own. For his first solo exhibition, 1963's *Exposition of Music and Electronic Television* in Wuppertal, Germany, Paik altered the circuits in thirteen television sets, thereby determining the conditions under which the broadcast image could appear: images were reduced to thin lines, warbling waves, trembling circles, blurred tonal fields, and single points of pulsating light. Paik and Abe's synthesizer similarly modified the video signal, but did so without altering the circuits of the television sets; their device manipulated the image in the studio then sent it out over the air. For the duration of the broadcast, the individual home receivers appeared to have been subject to a similar manhandling as Paik's first sets. In 1970, hundreds of TVs in the Boston area appeared to be "broken" – or at least deranged – during Paik's four-hour broadcast of *Video Commune: Beatles from Beginning to End*, the first on-air demonstration of the Paik-Abe Synthesizer. The Paik-Abe Synthesizer subjected live and recorded video images to a set of distorting processes that turned the visible world psychedelic and strange. Despite this abstract effect, the video image was still closely tied to the camera and its mimetic properties; the synthesizer needed the camera's images to "seed" its manipulations and distortions.

Stephen Beck, like Paik, moved away from the representational effects of the video camera toward the abstract possibilities of a purely electronic medium. He, too, created his first synthesizer in the late 1960s, and later worked at a PBS research lab. Beck's synthesizers, however, did away with the camera completely. They were, in his own words, "constructivist in nature, not distortionist." Beck's synthesizers were free from the camera's mimetic representations.

Beck's experimentation with electrical images began long before he had access to television set or a broadcast signal. While still an undergraduate at the University of Illinois at Champaign-Urbana, Beck invented a device he called "The Phosphotron." It consisted of 10 pairs of goggles wired in parallel to a single oscillator. Beck would connect a group of his friends to the device for a "video séance," during which the machine directed weak electrical current into the super-cutaneous surface around the eyes, causing a wild display of phosphenes to appear before the participants. They saw undulating colors, bright flashes of light, and floating shapes. The images hovered in space, but were not grounded in it. When Beck turned the machine up to about 20 hertz, the flows of light "broke into micro-textures very reminiscent of geometric, quasi-crystal patterns found in Islamic, Byzantine, and Ottoman art." [2] The

device brought to collective vision a set of non-objective, archetypical images using neither camera nor screen.

The young artist and engineer's desire to capture and communicate the fleeting, intangible, immaterial shapes of phosphenes and hypnagogic imagery led him develop a series of direct, that is, cameraless, video synthesizers in the late 1960s and early 1970s. The National Center for Experiments in Television (NCET) invited Beck to California to become a resident artist in their studio after hearing about his first analog synthesizer, the Video Synthesis Instrument Number Zero (VSI#0) (1969). The center was an experimental video division of KQED public television in San Francisco that specifically encouraged the production and broadcast of non-traditional forms of television. There he created two other synthesizers, The Beck Direct Video Synthesizer (1970-1971) and his first digital synthesizer, the Video Weaver (1973).

At 7:30 pm on 19 May 1972, Stephen Beck performed the Beck Direct Video Synthesizer live on KQED-San Francisco. According to Beck, it was the first – and perhaps only – live broadcast from a direct video synthesizer. [3] Beck's historical performance took place as part of KQED's news program, *SCAN*. Reporter Joe Russin interviewed Beck at the controls to give the viewers some context for what would follow. The young, longhaired artist explained, roughly, how the synthesizer worked while Russin, chin in hand, pondered Beck's curious answers. The synthesizer, Beck explained, "generates electronic signals which excite the television set to create light to happen where I want it to." Video, he provocatively offered, does not need to be "pictures of things." While the two men talked, Beck manipulated the synthesizer's controls, producing a rapid series of random patterns, graphic figures, and iconic images. The machine was a beast: color monitors and hulking switchboards stitched together with bright loops of yellow cable. [Fig. 1] The physical complexity of the synthesizer, with its exposed wiring and tangled connections, stood in sharp contrast with Beck's easy, graceful manipulation of the image. Despite Russin's contextual framing of the synthesizer, KQED's viewers frantically called into the station during the performance to accuse and compliment the broadcasters for "breaking" their televisions. [4] Yusef Lateef's music accompanied Beck's fluid, undulating color forms. The music was significant: not only did it link Beck's visual compositions with the improvisational form of jazz, the synchronization of visual and musical elements indicated, beyond a doubt, that the television wasn't "broken;" it was merely behaving in a way that seemed incompatible with its typical behavior and the conventional forms of broadcast television.

NCET went to great lengths to publicize and popularize their prodigy's invention and the growing field of synthesized video. Brice Howard, the Center's director, produced a series of "Electronic Notebooks," aimed at both distributing work by the Center's artists, and educating the general public about how to actually see the television rather than imagine that they were seeing through it. The series featured Beck on its inaugural episode. "Electronic Notebook No. 1: Video Synthesis" (1973) paired Beck on the Beck Direct Video Synthesizer with musician Warner Jepson playing the Buchla Audio Synthesizer. The episode opens on the two artists, side by side, at their synthesizers as a narrator compares the more familiar audio synthesizer to the processes of Beck's machine: both machines conjure "forms, textures, and colors" from electronic signals. The description links synesthesia to synthesis, as do the titles of the pieces that followed: *Illuminated Music 2* and *Illuminated Music 3*.

Illuminated Music 2 begins with a cut from footage of the artists to a blank, black screen. Two bright rectangular dots appear in the center, along the CRT's horizontal axis. The two quickly split into four; each dot and its double slide vertically away from each other and then loop into the center of the screen, and then disappear. They glide across the surface of the television, tracing a clear path without ever forming a proper image or shape. The pattern repeats twice over, and then quickly grows more complex: rather

than disappearing into the screen's central fold, the dots double and circle each other in a juggling pattern. The left side mirrors the right, only slightly out of sync. The slowly dancing points of light then quickly replicate themselves, extending in long chains to the center point of the screen. For a moment, the discrete dots take the form of an octopus, each long leg moving in a manner that is, at once, both natural and magical. The component parts of each undulating tentacle become independent fill the screen with a kinetic yet orderly field of static. The buzzing dots then melt into smooth airbrushed forms. By beginning with discrete dots - units of light - Beck slowly reveals the screen as, simply, a set of potential coordinates in space and time. What one sees is not an object or a representation or an image, per se, but the excited, ever changing surface of the screen; this is video freed from the camera.

From single points of light, the Beck Direct Video Synthesizer made the television screen and its basic operations visible and intelligible. One can no longer look "through" it as if it were a window to the moving image on the other side. One sees the screen for what it is: a flat field of points, a surface. In *Illuminated Music 2* the most basic unit of the electronic image pulsed and morphed into a dazzling and eccentric series of "archetypical" images – mandalas, geometric tessellations, phosphene flares, and hovering afterimages.

Beck's next synthesizer, the Video Weaver, brought into view another formal property of the video image, the horizontal and vertical scroll of the monitor's electron gun. Again moving away from the camera and the representational forms that it produces, Beck shifted the viewer's attention to the movements that make up the video image, rather than its component parts. Through Beck's new machine, screen's horizontal and vertical lines become the warp and the weft of a weaver's loom. The graphic patterns are in constant motion as they scroll across the screen. In *Video Weavings* (1973) [Fig. 2], Beck cycles through a series of traditional textile patterns: diamonds, chevrons, and argyles slide seamlessly into complex Hopi, Navajo, and Shaker designs. Beck's digital synthesizer analogizes the ancient technology to the new one: each creates an image built of lines read one by one. The weaver's thread becomes Beck's electron beam. Through the metaphor of weaving, Beck further extends video's point-by-point, line-by-line electronic logic to that of the computer: the Video Weaver is the descendent of Jacquard's loom. Joseph Marie Jacquard's 1801 invention, with its punch cards and prefigured sequences, anticipated the development of computer hardware and programming. Beck's weaver picks up this historical thread, and connects early video to generative and computational art. [5]

The non-representational, computational character of synthesizer video sits in an uneasy relationship to the history of video art. In the mid 1970s, video was just beginning to be theorized and historicized. In 1976 Rosalind Krauss famously condemned video art as narcissistic and unconcerned with the formal, "reflexive" investigations of serious artists and critics. Video, rather, is "reflective," that is, it acts as a mirror transmitting live, representational images, usually of the artist or viewer. According to Krauss, the self-obsession evident in early video art, however, is indicative to the medium and narcissistic video artists accidentally model the formal structure of video by obsessively using the device to record and respond to their own images. If video is a "medium," Krauss ventures, it is in the psychological rather than formal sense of the word – "telepathy, extra-sensory perception, and communication with an afterlife." [6]

Krauss's critique of early video does not take up the non-objective, non-mirroring work by Paik, Beck, and the other synthesizer artists. Instead it centers on a set of artists who had come to video after making their names in other media. The history of video art has largely followed Krauss's lead and bracketed synthesized video (with the exception of Paik's work) as a footnote to the larger history of artists' video, [7] despite its important role in the development of the genre and its enormous impact on future of the

media and technology. As early as 1974, Artforum editor, Robert Pincus-Witten cast them out of the discussion of video art precisely for being formalists and for being unconcerned with the representational image. At the Museum of Modern Art's conference on the state of video art, "Open Circuits: An International Conference on the Future of Television" (1974), an early academic assessment of video art, Pincus-Witten argued that the work of synthesizer artists "was deficient precisely because it was linked to and perpetuated the outmoded clichés of Modernist Pictorialism." Video, for the critic, was an inherently "reproductive recording medium" that "must always engage narrative content." The only achievement of the synthesizer artists, he claims, was the invention of the various devices. [8]

Non-representational, ephemeral, often unrecorded and cameraless, synthetic video found itself in a difficult position in relationship to criticism in the 1970s. In Krauss's and Pincus-Witten's accounts, video is a camera-driven, "reproductive" medium. Synthesizer video, then, simultaneously exposed a nature that seemed too inherently close to the waning principles of modernism, and in its experimental agenda it exposed most of what appeared to be the essential trappings of video – the camera, representation, tape – as not necessarily or inherently part of the medium. In doing so, synthesizer video surprisingly brings together the reflective and reflexive poles of Krauss's argument. Feedback, according to Beck, is "the imagery that results from the television set in a self-meditative state. Input is focused on output, its eye focuses on its vision, and in this meditative state it creates a specific graphic imagery." [9] When the camera looks at itself, it doesn't see as Krauss's "narcissistic" video artists do. What it sees is an ever-changing series of non-reflective images, variations on its own essential forms. In video, mandalas – those images that aim for unity and completeness through meditation – expose the screen as complete within itself. Beck's work extends this path of essential yet non-representational video forms to the screen without aid of the camera. Here, in the realm of pure video, Beck separates the image from the screen, just as phosphenes are visions separate from the eye. The video medium is at once, formal and reflexive, and at the same time "extra-sensory" and "psychological."

Clearly, Beck's synthesizer works call attention to the reflexive qualities of the video screen. The formalism that Pincus-Witten condemns seemed to destabilize the what appeared to be the very nature of television and video and in doing so, severed it from a clear lineage with representational media and mass media, such as photography and film – and even conventional TV – and established a new trajectory that linked it more closely to computer graphics and to future forms, such as video games and generative arts. Beginning with the feedback mandala, artists like Beck discovered how the camera's ability to transmit live, indexical, images could be used to free it and video screen to make imagery that was, at once, both abstract and deeply familiar. When divorced from its compulsion to mirror and capture the physical, visible world, video laid bare a parallel world of archetypical, geometric, non-objective images. Mimesis was just one function of video, not its essential, medium-specific quality. Rather than looking at the kinds of images a camera could capture, they sought out those that the screen seemed specifically able to produce. This meant seeing past the narcissistic seductions of the representational image, and looking at the device for what it was at base – a single electronic dot skating across the rasterized surface of a magnetic screen.

References and Notes:

1. Stephen Beck, interview by author, Berkeley, CA., December 7, 2010. I would like to thank the Berkeley Museum of Art and the Pacific Film Archive for allowing me access to the NCET collection. This article would not have been possible without their help and support.
2. Ibid.
3. Ibid.
4. Ibid. According to Beck, the station received more than 100 calls. The callers that charged the station with "breaking" their televisions were largely positive about the effect.
5. The Video Weaver was the "first use of digital video techniques even before the rise of the PC and digital video imaging on VAX and DEC minicomputers." Stephen Beck, e-mail message to author, September 5, 2011. See www.stevebeck.tv for clips of the works and information on Stephen Beck.
6. Rosalind Krauss, "Video: The Aesthetics of Narcissism," in October 1, no. 1 (1976): 52.
7. Lucinda Furlong, "Tracking Video Art: 'Image Processing' as a Genre," Art Journal 45, no. 3 (1985): 234.
8. Robert Pincus-Witten, "Panel Remarks," in The New Television: A Public/ Private Art: Based on Open Circuits: An international Conference on the Future of Television, eds. Douglas Davis and Allison Simmons (Cambridge, MA: The MIT Press, 1977), 70.

TRANSCENDING INTO THE VIRTUAL: PRESENCE PROGNOSTICATIONS AND THE RE-CALIBRATION OF TELEMATIC ART

ELLEN PEARLMAN

Telematic Art is artistic collaboration over robust 1gigabyte fiber optic research networks. This paper explores recent experiments in telematics with 3D Virtual worlds, improvised performance, motion capture suits, spoken word, video art, live and pre-recorded dance, VDMX VJ effects, MAX/MSP/Jitter and various music and sound programs with live audiences and on-line performances.

Fig 1. The dancer's outline of herself in the "Nuclear Sweet" video, produced when her motion became sound and the sound became dark pixels of herself mixed into the video sent through a network connection.

Fig 2. Text poem in white, four video clips projected on boxes, Actor reading on Skype, motion capture studio with dancer on grid from Hong Kong for Syneme Summer I.

Fig 3. Pixellation, chroma and drawing (blue lines) manipulated by finger bending in "Here and There".

The Wonder of the Ancestral – In a Post Modern Kind of Way

Telematic Art originated from developments in computer art, hardware and networking technologies based on algorithmic and mathematical art. This has enabled new forms of representation and interactivity in group authored artworks over networks. For the most part sound, or sonic arts has formed the basis of development for many experiments at Syneme Labs based in Calgary, Canada. New media with each new iteration tends to develop and embellish the framework of older mediums it references as a kind of augmented proxy. In that sense what Syneme has done resembles the early experiments with the telephone when Alexander Graham Bell uttered his famous sobriquet, "Watson, can you hear me?" Initial connectivity for Syneme focused on uncompressed audio over high speed fiber optic research networks, especially but not limited to IpV6. [1]

The first piece of computer-based art appeared in 1951 when John Whitney used left over bits from defunct analogue computational devices. Most technology now in vogue, including "3D goggles, network art, computer-generated choreography, bio-computer interfaces, expert systems, robot art, ... were already common currency in the 1960s and 1970s." [2] Roy Ascott in his essay "Is There Love In The Telematic Embrace" [3] clearly understood the implications of of the confluence of "video, sound synthesis, (and) remote-sensing. He defined telematics as "Computer-mediated communications networking involving telephone, cable, and satellite links between geographically dispersed individuals and institutions that are interfaced to data-processing systems, remote sensing devices, and capacious data storage banks." The observer/participant and the system they are working within are in a constant state of change and even instability because the content is electronic and digital until it reassembles itself as one of a number of different art forms. The art object changes into a "cultural communication system." Telematic communication "extends the gaze, transcends the body, (and) amplifies the mind into unpredictable configurations of thought and creativity." [4]

There were few instances of these developments; Kit Galloway and Sherrie Rabinowitz's ground breaking 1977 *Satellite Art Projects,* Roy Ascott's clever 1980 *Terminal Art*, and at ISEA'94 in Helsinki, Paul Sermon's *Telematic Vision.* It showed a video camera recording events on two separate couches. A person sat on a couch in each location. On a monitor that mixed the images both individuals could see themselves in virtual space sitting together, and could interact and respond to one another. Since this paper is not on the history of digital or telematic art, these examples are just a tiny slice of the work that has preceded these investigations. Not all Syneme performances and concerts in the past two years are mentioned, just those that this author participated in.

In The Beginning Was Sound: A Sense Of Urgency – Making the Connection

2009 - OCTOBER

On October 27, 2009 I sat in the auditorium at the China Electronic Music Center (CEMC) at China's Central Conservatory of Music in Beijing. This was the first time that the Central Conservatory of Music used its new high speed fibre optic connection to initiate a telematic concert with Canada. Bruce Gremo's played *Calgary Interventions* on his Cilia flute controller using MaxMSP. For improvisation he took a soprano saxophone signal from Jeremy Brown in Calgary and let three continuous streams from that data control his output. I watched Bruce on stage, and saw Jeremy projected on a screen overhead. An image

of a whirling graphic appeared on another projection screen. This was the first telematic concert I had seen and I secretly hoped someone would jump out of the screens and do something on the stage. [5]

The technical obstacles to this concert, which included other musical compositions between China and Canada, were formidable. Before any of it could occur, a fiber optic line had to be taken from a Beijing research university and physically cabled over to the music conservatory. The Jack OS software that enabled the connectivity needed to be implemented, tested and stabilized. Wang Ke (Haku) a Beijing music student and programmer modified the original Jacktrip program to make it compatible with Ipv6.

2010 - JANUARY

In January, 2010 I began my studies in telematic art at the University of Calgary with the Canada Research Chair in Telemedia Arts, Ken Fields. Ken had laid down the fiber optic line in Beijing and set up that first concert. By the end of January I was working with other students on the NetTets 2010 Happening Festival facilitating a concert between the Central Conservatory of Music, China, Tavel Arts Technology Research Center, Indiana University Purdue and the Yong Siew Toh Conservatory of Music and the Arts and Creativity Lab, Interactive and Digital Media Institute of the National University of Singapore. A percussionist played live time at the Rosza Theater at the University of Calgary watching musicians on a projection screen in Singapore, Beijing and Indiana. Everyone could see one another and play together. The average latency of sound between node points was about 300 milliseconds. This setup had been accomplished using JackTrip audio software and a Lifesize video conferencing system that compressed the video signal.

It was thrilling we made the connections work between four timezones and everyone played together in front of a live audience. [6] This proved that four countries could play a concert together live time, and was an important next step for our research.

You Can See Me - Now What?

2010 APRIL

On April 24th Syneme Labs presented a 15 minute performance at the Indiana Intermedia Festival,aproduction of the Donald Tavel Arts Technology Research Center, Indiana University Purdue University Indianapolis. This performance consisted of Syneme Labs, musicians at the Tavel Arts Center and a group of 3D artist at the HR School of Fine Arts in Bloomington. [7] The artists 3D world made in 3Dvia Player was sent to Syneme Labs from Indiana utilizing the LifeSize and Tandnburg systems, and projected onto our right most wall. At various times Syneme had its own 3D world created in Maya3D projected onto the left wall. A dancer moved back and forth between the two worlds, and a third image on right projected what our studio camera was recording. This image was sent to Indiana for projection on stage at their Tavel Arts Center. At different times pre-recorded effects from VDMX, a VJ software were projected onto the dancer. Pre-recorded music in the Syneme lab also played in the background. All of this was sent back over the network to Indiana where three sets of live images were projected while musicians on stage improvised and played their own scores.

During the concert Syneme could not see the live stage in Indiana, though Indiana could see whatever images Syneme chose to send throgh its live camera feed. We were able to shift back and forth between

the 3D virtual worlds and the VDMX projected worlds by using the LIfesize conferencing system software. By introducing a robust visual intervace and a life dancer interactivity and presence factors were greatly enhanced.

JULY 2010

The First Annual Syneme Summer Institute in Telematic Art was launched with participants from Calgary Canada, Beijing China, Bournemouth United Kingdom, Waikato New Zealand and Indiana Purdue, USA,[i] using a variety of technologies and means to project video, poetics, motion and sound into the studio. One person read over Skype excerpts from the Bible and Chairman Mao's Book of Quotations. These excerpts were translated into 85 English letters aligned equidistantly without spaces between words or punctuation, as they would be in classical Chinese and ancient Hebrew. The visual texts were displayed and read by viewers. The text was projected onto a horizontal square. Underneath the text, projected onto white vertical boxes were videos that had been FTP'ed from Hong Kong and projected through a MAX/MSP VPT (Video Projection Tool) patch. On the right was a live animation of a dancer in a motion capture suit performing on a green grid. Our aim was to have the motion of the dancer control simple parameters in the video such as on/off or brightness, or saturation. Music originated from New Zealand and Calgary. [8]

There was a time lag between the movements of the dancer in Hong Kong and the movements of the dancer appearing on the grid screen in Calgary, but it did not affect the performance.

There were many technical issues to resolve. Since the Summer Institute lasted only three weeks, the deployment of Hong Kong PolyU's staff including the HARNET, the Hong Kong fibre optic backbone required constant debugging. A programmer in Beijing opened up the SDK of the motion capture system to change its parameters. The frame rate of motion capture had to be reset to work at the unusual rate of 60 frames per second so the x, y, z coordinates of the animated motion capture software could be streamed to Calgary.

DECEMBER 2010

In December Syneme facilitated ResoNations, Arts for Peace of the UN-NGO WAFUNI. Renowned musicians from New York, Beijing and China participated. Not all partners were on IpV6, some were on IpV4, so Syneme acted as the switching station in routing network information between these countries. [9] This concert resembled the January 2010 NetTets concert because it connected three disparate locations together for a music performance

JANUARY 2011

On January 29th, 2011 at the NetTets2011 Festival I premiered "Nuclear Sweet" [10] a telematic performance based on formerly classified videos of nuclear explosions from the 1940's-60's that were filmed and narrated by a cadre of Hollywood elite sworn to decades of secrecy. This distributed performance event worked with a live dancer who, through movement was able to generate and manipulate sound in real-time with the interplay of imagery. The dancer's movements were captured in the camera and processed with a motion capture function in Isadora Software. The velocity of her movement was then sent over the network to a MAX/MSP granulator patch. At various times in the performance the sound

or pitch from the granulator patch was routed over the network back into the videos playing behind her, disrupting the pixellation with a ghost-like image of her form appearing in the video. Simultaneously music was sent over the network live time from Indiana U.S., by a musician who was watching the performance via a live video feed. His audio connection was over JackTrip.

APRIL 2011

On April 21, I worked on the visual component of "Here and There," [11] a musical piece for ham radio written by Stuart Saunder Smith 30 years ago. For this piece I made a flex sensor glove that was connected to an Arduino board and worked with effects in MAX/MSP/Jitter. These effects consisted of changing the pixellation and brightness, contrast and saturation of an image by moving my fingers. I could also blend muliple images and awkwardly draw a crooked line across the screen, then erase the line with a flick of one finger. These images were sent over the network using Skype and projected on a screen in front of a live audience. They were manipulated in response to the live time music in Indiana. These crude effects proved live time manipulation of a broadcast image could be sent over the network in response to music and other stimuli.

SYNEME SUMMER INSTITUTE II

Returning to Hong Kong for Syneme Summer II, I created "I Move In Decades," a telematic performance about the tenth year anniversary of the attack on the World Trade Towers. Using the talents of professional dancers, musicians and video artists, it built on the research done in Syneme Summer I of converting motion capture data to OSC. For this iteration dancers were rigorously mapped with their x, y, z coordinates using specific trigger points on the wrist, elbow and ankle. A clear range of motion was codified. The data was successfully converted to OSC. However, the MAX/MSP patch was not ready to be used in time for the performance, so the live time OSC data was stored. An asynchronous use of it will be used with a MAX/MSP patch. [12]

References and Notes:

1. IpV4 is also used.
2. S. Mealing, ed., Computers and Art 2 (Bristol: Intellect Ltd., 2002), 129.
3. R. Ascott, "Is There Love in the Telematic Embrace?" in Art Journal 49, no. 3. (1990): 241-247.
4. R. Ascott and E. A. Shanken, Telematic Embrace: Visionary Theories of Art, Technology, and Consciousness (Berkeley, CA: University of California Press, 2003).
5. Beijing, Calgary, Vancouver.
6. Nou Ri Lang, Zhang X. CH, Stones: C. Wolff performed by Ang M. F., T. Constant, P. I. Edwards, S. M. Miller SI, V4V6, K. Fields CA, Calgary Interventions, B. Gremo CH
7. Syneme, IUPUI Telematic Group, HR Hope School of FA. Indiana U
8. E. Pearlman, G. Yu N. Lau, A.L. Wing Sang HKPTU, A. Choi, Videotage, Wang H., Zhang R. CEMC, Bournemouth: C.McKinney, Waikato: I. Whalley, Indiana Purdue: S. Deal, Calgary: K. Fields, R. Gill, R. Majzels, C. Huot, Yu H.
9. S. Weaver UN/NY Y.J. -Heo KR, Min Xiao-F., CH
10. E. Pearlman, J. Mahood, R. Gill, S. Deal
11. Stuart Sanders Smith Composer Played by J. Fielder visual effects E. Pearlman
12. E. Pearlman, V. Chan, M. Hui, S. Wang (HK) E. de Vegt (NZ), G. Yu N. Lau, A.L. Wing Sang,(HKPTU) I. Leung Videotage, K.Fields, R. Gill, CA.

BODYCAD: CREATIVE ARCHITECTURAL DESIGN THROUGH DIGITAL RE-EMBODIMENT

BANU PEKOL

Combining architectural theories with insight from courses/workshops taught to architects on embodied design, this paper deals with the question of how the use of digital media in architectural design can propose creative conditions for movement and how movement creates similar openings for architecture. It demonstrates the need for the creation of an informed architecture inviting movement through relational architectural interventions.

Architecture incorporates the possibility of action, which is naturally tied to a bodily reaction. Any structure that aims to be evocative should go beyond the merely visual. Unsurprisingly, the same can be said about choreography. This paper aims to demonstrate how architectural education can be enriched through digital spatial analysis tools which stem from the need for an enhanced bodily awareness for architects. The projects which this paper refers to are all concerned with deconstructing space such that it is experienced differently: through the use of the graphic programming environment Isadora, the structure provides a reassessment of itself. Methodologies for assessing the impact of movement on the perception and cognition of architecture have yet to be developed fully. The experience of space is closely tied to what it means to be a subject and with the constructions of subjectivity. This paper argues that both architecture and dance are about experiencing and visualizing space, which furthermore shapes the creativity as well of subjectivity of architects (or even, dancers).

Architecture is a dependent discipline. Yet also, architecture, as a profession and practice, does everything to resist that very dependency. This means that architecture is influenced by external forces from the design stage to the construction and even occupation stage. Thus, even if the architect has internal processes of her own, it is the external forces that shape the architecture itself. From this dichotomy arises a gap, which this paper engages with by incorporating the body and movement into architectural creation. Beginning as a consequence of the Beaux–Arts system, architecture has retreated into an exclusive and self–referential world. Today, even if the architectural outcomes in schools look radically different, the processes and methods used to achieve these outcomes are analogous. In some schools, conventional software is put aside for new algorithms generated by the students, which actually all follow a similar value system. [1] Progress seems to be represented by technology combined with aesthetics, using the newest technologies, forms and surfaces available. This is mainly due to scrupulous attention being paid to winning the client or audience, using various visual ploys and tactics. Also, the inevitable use of photographs in publications shifts our attention from architecture as a spatial whole, to the representation of it. Further, as curriculum requirements become standardized, more technical and even administrative skills being expected from an architecture graduate.

Architectural Theory and Embodiment

Kant defines space as an "a priori representation which underlies all our outer intuitions." [2] The space he explains is mostly derived from inside the subject, rather than external factors. This is a notion which implies that space is created from within the individual, a theory has been proven scientifically through

evidence that a certain area within the human parahippocampal cortex is more active in response to lay-out of space, as compared to using only objects as a reference point. [3]

As the German philosopher Johannes Volkelt argued in the late 1870's, the composition of a particular space can only be explained through movement and we must participate in this *emotion of movement* in order to understand it aesthetically. Such participation will provide the viewer with a more holistic experience of the building. Even though the importance of space is acknowledged in architectural historical literature (always within the limits of a privileged historiography), this is not extended to movement through space, and how the body responds to space.

In the second half of the 20th century, J. J. Gibson challenged the concept of visual perception and demonstrated that it is part of a perceptual system which actively involves locomotor movement. J.J. Gibson's reversal of sensory apparatus with types of environmental information the body deals with can similarly be adapted to this case. The function of architecture as stable and inert, and the body as a walking organism can be applied in such a way that architecture is regarded as the information that one can interact with, and accordingly the body will be forced to acknowledge the space created by the architecture: a new language, or inventory for movement will be created.

Heidegger's concept of *ent–fernung* –where one distances herself not according to physical distances but to what is important to her– is also useful to elaborate what is aimed at in this project. [4] In this way, physical priorities are played down and factors such as the perceptual and social can be engaged with much more efficiently. Space becomes a vessel for possibilities (social, cultural, perceptual), merging the body phenomenal and body politic.

Lefebvre, in *The Production of Space*, argues that space is produced by multiple social forces which he categorizes into the perceived, conceived and lived. This argument is useful to show that architectural design is one aspect of spatial production, and that the other agencies are as valid, if not more, than architecture. [5]

A work of architecture, even if its outer walls remain put, has within it spaces that can change or move. The "mobility of building and within building is one possible idea of Deleuzian thought that might be of tremendous value in architecture." [6] Building is generally understood as the movement of materials for the final stabilization of a structure. Yet the activity of building should also be seen as a method of creating, opening and unfolding spaces. This means that a building can allow new methods of mobility, movement and change.

Why should a building built by humans who inhabit their physical bodies not be influenced in a more informed way by these bodies? The corporeal presence of a building is thus both an apodictic part of design, and also an element of architecture that is not as removed from the architect as, for example, the infrastructure. Architects should feel free to seek ideological inspiration beyond their field of discourse. Such inspiration and expressive potential can then be used not only for conceptual propositions, but also physical applications. In turn, this will bring closer the architect and architecture, the designer and the design.

Movement and Architecture

Defining architecture through a field not normally and necessarily perceived to be related to it allows us to engage in a dialogue with architecture which would otherwise have not been possible. Architecture and movement can be studied together, but for what use? The means of architecture are basically set forth by our capabilities to make and sense physical distinctions in space. Movement/dance is not a part of architectural education, or vice versa. Yet both disciplines can borrow from each other in their process of creation. For example, both dance and architecture organize space. However, therein lies a nuance: dance de–stabilizes the space for the in stasis spectator, while architecture reinforces the space with factors such as gravity and functional necessities. Architecture can be considered as the main, dominant discourse for structuring space, and dance can be considered the main discourse for 'feeling around' space. A dancer can articulate space in a way much different than an architect. If architecture is a "set of practices, techniques and skills" then dance can provide a further set of skills or techniques to it.

Our bodies as psycho–sensorial systems are capable of picking up and sending haptic signals and responses. Architecture is capable of creating a bodily response and participation; however few buildings succeed in doing so. Since all buildings are created with the human mind, it is first and foremost the mind that should work with the body to become aware that architecture –which embodies the possibility bodily interaction–, will enrich the human experience. The interaction may not be tactile; it can be imagined as well, by envisioning flying over and under buttresses, gliding along curved walls or soaring upward through stairwells. An initial disorientation is necessary to then become aware of the spatial relationship of our potential movements with the architecture itself.

As Le Corbusier says, architects live in the extraordinary world of the acrobat. [7] Dance and architecture both frame, articulate, structure, give significance, relate, separate and unify, facilitate and prohibit. Mostly, they do this through logic of visualization stemming from notions of perspective, and thus viewing the world in a Cartesian way. If we consider the logic of visualization, we understand that seeing things from such a particular perspective or viewpoint locates the viewer and affects their sense of subjectivity. But dance and architecture also can disrupt this logic by lessening the distinction between buildings and space, inside and outside. Distinctions between warm and cold, still or windy air, scents and sounds, the feel of various surfaces are all components of architectural experience that can only be enhanced through being exposed to and creating such sensational experiments.

The Graham technique in modern dance uses exercises based on the haptic experience of space. The expression of 'feeling the space' is almost literal, as dancers who practice this technique pull and push the space around them to give meaning to their movements. Rudolf Laban's dance notation is another attempt to define space through the movements of the body using geometric planes.

Digital Tools and Architectural Embodiment

Choreographers have been working with digital platforms since the 1990's in order to pass on their choreographic theories and practices to their future company members, or interested dance–enthusiasts. The most well known is William Forsythe, who has worked with researchers and artists from varied fields for his award–winning online dance notation 'Synchronous Objects, for One Flat Thing Reproduced'. His works are interesting because they are able to convey his choreographic logic not only to dancers, but also non–arts specialists such as cognitive scientists.

Such open–ended digital educational tools are becoming ever more popular. Architectural education has been using digital platforms mainly for translating the sketched image into perfectly calibrated drawings, and easily manipulating it once on screen. Even with 3D renders of architecture, the fact that the viewer's body is motionless while looking at a flat screen remains unchanged.

The gap between the internal processes of the architect and the external forces that shape the architecture can be studied through digital technologies. Architecture is taken here in the context not only of the built environment but in the multiple groundings and environments for movement. Architecture does not necessarily mean the practice of building; the intelligence from architectural education can be applied in various ways. This conclusion that models used in design science are metaphors which convey their meaning by way of a hermeneutical understanding has been exemplified in multiple studies. [8]

"Aesthetic and cultural practices are peculiarly susceptible to the changing experience of space and time precisely because they entail the construction of spatial representations and artefacts out of the flow of human experience." [9] The outcomes of working with architecture and dance not only benefit the digital representation of space and architecture; they redefine a movement vocabulary. When walking on the ground, one notices a small inclination, or any irregularity. The muscles and balance, adapting to the surface, automatically compensate this. When using a virtual model, such automatic reflexes do not exist at first; they must all be learned and experimented with, to find the ideal response. The walls, although virtual, represent obstacles, and since the voyage is undertaken not just by walking on the floor, the ceiling, walls, windows, doors and columns all have as much importance as the floor. Architectural elements gain a new meaning, and features such as arches which used to be structural and decorative, now interact with the inhabitant.

The idea that aesthetic perception of architecture should be enriched with the inclusion and application of full spatial comprehension forms the basis of this paper. Since Kurt Gödel, it has been confirmed that no system of logic can contain its own explanations: a given system is always built upon axioms which are subject to further analysis. The form of one system becomes the content of the next higher system, and so on. So, the form of the building is the content of our interaction with it. You cannot interact with a façade. The project similarly is a work on oneself, on one's own interpretation on how one sees things etc.

The following examples aim to illustrate how such participation can be developed, and how the body can be used interactively with the space/architecture around the architect in training so that architecture becomes an expression of life, rather than an evasion of it.

ARCHITECTURAL BODIES

In the workshop titled *Architectural Bodies: Experiments on Gestures*, conducted by the author in Summer 2011, participants were led through a series of intellectual, cognitive, and physical exercises that seek to question the relationship between gestures and architectural spaces. Both the technical as well as the creative processes underlying this workshop allowed the participants to experiment with their own perception of 'natural gestures' as well as creation of 'spatial gestures'. For the workshop, using the graphic programming environment Isadora, a computer programme that analyzes real–time gestures and their interaction with various architectural settings was prepared. Each participant formed her own "spatial gesture" by choosing a particular pre–recorded space and through the computer program output constructed a physical response to the space with her own body.

This workshop aimed to demonstrate how spaces condition particular gestures, and how gestures are inherent even in activities where only one person is involved. The translation of gestures into architectural images provide an exciting yet challenging insight into how dominant jests can be re–evaluated within the context of space–creation. Architecture students, who are used to working with AutoCAD, Rhino and other computerized architectural programs, when faced with their body in space, acknowledged that their bodies in space have no relation to the straight lines or geometric shapes which they are accustomed to working with. In the workshop, the real and the virtual imply each other continuously. Through the experiences gained from virtual interactivity, the sequence in which the content is structured will not –as is customary– stay linearly organized, accessed and unchanged.

The workshop allowed the participants to acknowledge that gestures can not only be understood as re–presenting body–images, as the movements of the participants were driven by proprioception rather than architectural design principles taught in their classes. This fact is reminiscent of Agamben's argument that "If dance is a gesture, it is so, rather, because it is nothing more than the endurance and the exhibition of the media character of corporal movements. The gesture is the exhibition of mediality: it is the process of making a means visible as such". [10]

One other program prepared for the workshop connects the limbs of the participant to a 3D CAD mode, using sensors. The spatial limits of the building make the voyager move in a certain way, completing the interactive cycle. The space suggests a particular way of movement to the voyager and with this suggestion it will reveal that which it is harmonious with, and anything that prevents it will seem out of place. This can then be linked to the design problematics in architecture, pre–construction analysis, or to different analyses of theories of architectural analysis. The user of the program must always try to think of and use 'form' in its full spatial completeness. In order to do this, she stops prioritizing the façade. This is akin to when in dance, the dancers are constantly reminded to feel their centre and move through the manipulation of the centre. Such a centre of intention can be formed in architectural movement research. Thus, through our interaction with the work and our decisions to move in a particular way throughout this interaction, we meet ourselves in the work.

The workshop also draws from Paul Schilder's concept of "body image/body phantom" which is a neuropsychological mapping of the body which refers to the inner image of one's outer, physical appearance. The graphics, formed by the workshop participant's bodies on the architectural videos provided an alternative body image. By internalizing the external to the body (the architecture, in this case) into her corporeal activities, the participant began to adapt her body to the context.

BODY AND SPACE IN ARCHITECTURE

An undergraduate course titled *Body and Space in Architecture* created and taught at the Mimar Sinan Fine Arts University's Faculty of Architecture by the author, focused architecture undergraduate students on architecture and embodied design. The majority of students had difficulty tearing themselves away from the obsession with producing visually impressive work. Once they got the hang of the subject, they began seeing the body in every aspect of architecture. After completing their end–of–year project, the students came back with results that they confessed they had not expected, with comments such as realising that functions were not the same as desires in architecture. This implies that their education which included courses on ergonomics was in need of a supplementary module which demonstrated the versatility of the body in architecture.

Conclusion

The theoretical background along with the examples from educational practice complete circle back to William Forsythe, whose understanding of space is "an inclusive concept that even integrates the interior of the bodies, breath, and most essentially proprioception; all of these factors become interfaces for artistic response and creation." [11] Forsythe's CD–Rom 'Improvisation Technologies' applied geometries of objects in the space around the dancer onto the dancer's body. The digital practices where body becomes space itself can be applied to architecture students who will then stop relying on their auto–pilot (or rather, auto–architect), and engage in a more intimate and visceral manner with their design concepts. Heidegger's suggestion that we live in the space opened up and revealed by technology rings true once more, in this context. [12]

Architecture is generally experienced by dwelling in it. August Schmarsow 's term *Raumgefühl* (sense of space), rather than *Formgefühl* (loosely translated as sense of form) is what should guide the design approach. The architectural experience of a space should be extended from only accepting it as a dwelling to a more aggressive, seeking approach to architectural forms with the use of new psychophysical coordinates. Architectural design can become a process of interpretation, rather than focusing on presentation and representation. This re–shaping of space–creation through digital tools should be presented as an educational model based on the creation of an informed architecture that invites ways of moving through not just bodily gestures of the humans themselves but relational architectural interventions.

References and Notes:

1. *Jeremy Till, Architecture Depends (Cambridge, MA: The MIT Press, 2009), 14-15.*
2. *Immanuel Kant, Critique of Pure Reason, trans. Norman K. Smith (London: Macmillan, 1929), 71.*
3. *Russel Epstein and Nancy Kanwisher, "A Cortical Representation Of The Local Visual Environment," in Nature 392, no. 6676 (1998): 598-601.*
4. *Martin Heidegger, Being and Time, trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 2005), 140.*
5. *Henri Lefebvre, The Production of Space (Oxford: Wiley–Blackwell, 1991).*
6. *Elizabeth Grosz, Architecture from the Outside (Cambridge, MA: MIT Press, 2001), 7.*
7. *Le Corbusier, My Work, trans. James Palmer (London: Architectural Press, 1960), 197.*
8. *Adrian Snodgrass and Richard Coyne, "Models, Metaphors and the Hermeneutics of Designing," in Design Issues 9, no. 1 (1992): 56-74.*
9. *David Harvey, The Condition of Postmodernity (Cambridge: Blackwell, 1992), 327.*
10. *Giorgio Agamben, Means Without End: Notes on Politics, trans. Vincenzo Binetti and Cesare Casarino (Minneapolis, MN: University of Minnesota Press, 2000), 58.*
11. *Peter M. Boenisch, "Decreation Inc.: William Forsythe's Equations of 'Bodies Before the Name," in Contemporary Theatre Review 17, no. 1 (2007): 15-27.*
12. *Martin Heidegger, "The Question Concerning Technology," in The Question Concerning Technology and Other Essays. trans. William Lovitt (New York: Harper and Row, 1977), 12-14.*

SUBTLE PRESENCE: DESIGN AND IMPLEMENTATION OF USER CENTRIC CONTENT DELIVERY USING BIOMETRIC DATA CAPTURE AND INTELLIGENT ANALYSIS

WILLIAM PENSYL

Explores the user centric delivery Media content, using biometric data capture, intelligent analysis of facial data, age, gender and other forms of data that can be directly captured in a non-invasive manner. The system has an inherent intelligence that is ambient, and ubiquitous – allowing for interpretation of a wide variety of stimuli and that can be easily collected.
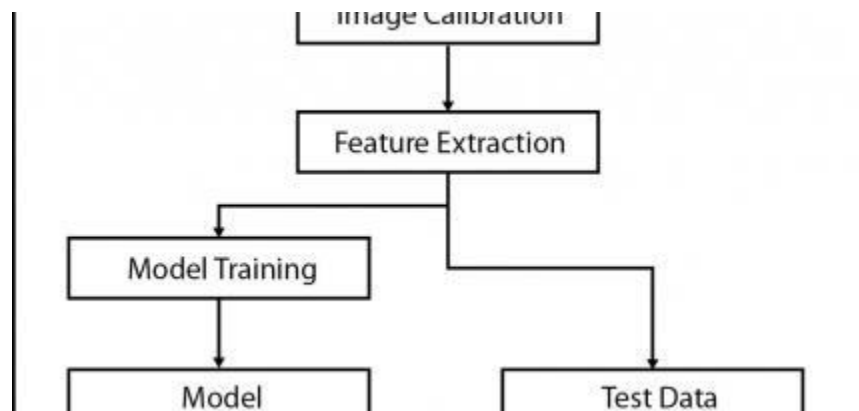
Figure 1. Processing Flow Diagram of HiPOP System
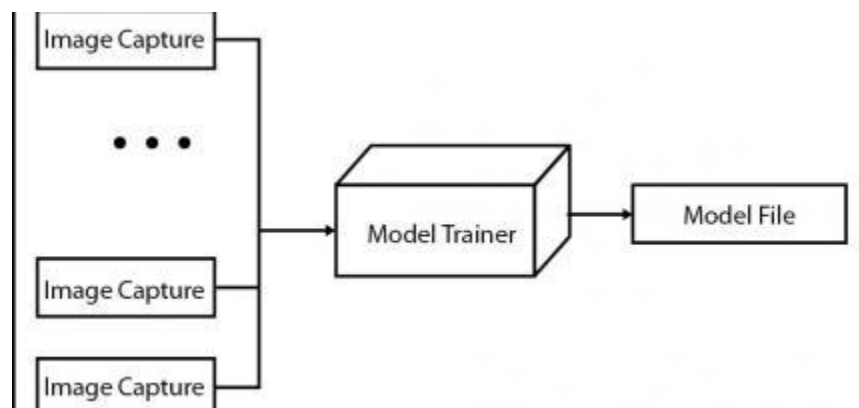
Figure 2. Data Training from Datasets

Figure 3. Subtle Presence, presented in the 2011 Sarajevo International Winter Festival.

This paper presents design and implementation of user centric content delivery using biometric data capture and intelligent analysis. We describe feasibility and successful implementation of responsive information delivery tools prefiguring facial and biometric data to cue advertising, social communication or culturally relevant user experiences. Initially designed for marketing content in public spaces, the content delivery can vary depending location and population demographics. Various forms of data, captured in a non-invasive manner, including facial images, height, body type, age, gender and aspects of mood can be used determine appropriate media delivered based on these personal attributes. To alter the type of media content presented in advertising, in retail environments, exhibition installations or public spaces, it may prove useful for media designers or systems designers to be able to assess certain personal attributes of the viewer in the space. We refer to this system as HiPOP – A High Impact Point of Purchase content delivery system.

The system uses ambient and ubiquitous intelligence to detect a face, calibrate the image and extract features to classify and determine personal attributes. After testing for gender and age group, media content is presented based on these attributes. Such a system must have an inherent intelligence and modest decision making ability that is ambient and ubiquitous – allowing for interpretation of a variety

of stimuli. The intelligence must allow meaningful responses to visual and sensor cues. There are many possible applications for the implementation this system, including, information delivery for targeted advertising, social communication in public environments. It also can be used to create socially engaging integrated media artworks within architectural and exhibition spaces. This allows viewers to engage in aesthetic experiences that are subtly responsive to their personal physical attributes and moods.
Project overview
There are a number of developments that are required for this type of information delivery. These build upon previously published biometric data capture techniques. The significance of the work lies in the development of an autonomous, intelligent system that can deliver user specific information based on the collected data of a viewer's gender, height, weight and other cues that allow for a definition of a user profile. One critical aspect to such a system is an ambient and non-invasive data capture with a naturalistic, subtle response to the user.

There has been much research on capturing user biometric information, gaze detection, posture, and these have been used to create interactive systems that allow for more natural interactions in games, interactive and environments. However, no application has been developed for point of purchase environments. In this project, we want to focus on getting useful information delivered for viewers in this specific application. Furthermore, we utilize hardware/sensor and vision systems to increase the range and accuracy of information delivery, providing better solutions for advertising, customer support, and open these platforms for the creation of interactive artistic installations.

System overview
The system processes the images captured through three modules: a "Detection Model," a "Data Training Model," and a "Demo Showing Model." The Detection Model algorithm detects a face, calibrates the image and extracts features using OpenCV, Haar-like application and LibSVM to classify and determine gender. [11], [8] An AdaBoost learning algorithm boosts classification performance. [6], [7] [8] The Data Training Model uses a cascading classification method and a LibSVM to train analysis of data and generate a final data model file. [8] The Demo Showing Model manages windows for the system and audience delivery content. The detection result is shown in face detection window and scene view window. The content images or steaming video is shown in a second display monitor.

The Detection model uses sensing and vision technology that captures a video stream, an algorithm that analyzes and identifies if a face is present, then compares the detected face to a library of defined face images organized by gender and age. This allows for the determination of characteristics including gender and age within a set of age groups. The method of detection and classification uses OpenCV Haar-like Features to find a face rectangular within the space where video camera is pointed. [1] A LibSVM is used to classify and determine the final result in gender and age bands. The results of the content delivery selected are targeted to groups that are more easily defined. [8] Gender is easier to detect than age. The fine distinction between age within the small child group, or with the adult groups is more difficult to accurately determine.

The HiPOP System is detailed in the processing flow diagram in Figure 1. The image is captured by any consumer grade webcam and passed to the face detection and image calibration module. The features are extracted via a very fast feature evaluation using Haar-like functions and AdaBoost [5] to increase to focus in a small set of critical features.

The Data Training Model is necessary to ensure the software algorithms can compare the data set of images with the library and the images captured can be calibrated to increase accuracy in the final result.

Using the LibSVM data file the system is trained to analyze the data, to classify the faces according to a set of grouped ages and genders, and to generate a final data model file. Different data models can be created using different data sets. The Demo Showing Model shows the data detection results and sends the data to playback system, either a QuickTime or Windows Media Player.

This implementation relies on published work on Haar-like Features [10]. Haar-like features are digital image features used in object recognition. They owe their name to their similarity to Haar wavelets. Viola and Jones implemented very high frame rate object detection with only the information in a single grey scale image, using rectangular Haar-like features. A simple rectangular Haar-like feature can be defined as the difference of the sum of pixels of areas inside the rectangle, which can be at any position and scale within the original image. This modified feature set is called two-rectangle feature. Viola and Jones [1] also defined three-rectangle features and four-rectangle features in the object detection framework. The values indicate certain characteristics of a particular area of the image. Each feature type can indicate the existence (or absence) of certain characteristics in the image, such as edges or changes in texture. For example, a two-rectangle feature can indicate where the border lies between a dark region and a light region.

The Viola-Jones object detection framework has three steps to extract features and classification. Rectangular Features are enclosed within a detection rectangle. The area rectangle is divided horizontally and vertically. The value of the divided rectangles is determined and the differences in features are found. Viola and Jones refer to the method employed as the "Integral Image." This first step is used to determine the rectangular features in an intermediate representation. The Integral image allows the number of iterations in processing the image to be limited, thus increasing the speed of the feature extraction. The second step uses a variant of the AdaBoost [5] to select a small set of features and train the classifier. First, collect a group of pictures, some with human faces and some without. For each image, give the image a weight (1/m [human face], 1/l [non-human face]). And then extract "T" features from a lot of images. The processes for extraction, repeated T times are: first, standardize the weight, the sum is 1; second, pick up the feature that has smallest error; third, record the parameter where the error is smallest; and finally, refresh the image weights. After the above processes, we can decide if this image contains a face. The third step uses a set of Cascade Classifier Functions to compare iteratively against at library of images that are previously classified as faces, and within a gender or age group. Through testing and comparison of the captured face, the result is determined, within a margin of error. A larger library for comparison increases the accuracy of the result. There is a trade off in the speed of processing due the comparison of larger ldatasets. For purposes of this implementation, the determination needs to be very fast. To maintain a fast response, we work with a limited set of images in the library. The first step determines the results in male or female gender. Following, the face images are classified via the cascade classifier function to determine age grouping. In our implementation, the age groups are limited to child, teen, young adult, adult and seniors. The system implementation also includes the detection of a smile, adding the potential for determination of a certain amount of mood within the face of the individual viewed.

To increase the accuracy of the result, determining the age and gender, the data training models Support Vector Machines (SVMs) supervise the learning methods used for classification and regression. SVMs are classifiers the extract the results belonging to one of two categories. The SVM training algorithm builds a model that predicts whether a new example will fall in to one or the other category. The use of the SVM increases the accuracy of the resulting detection.

Implementation

The HiPOP system was designed for environments where narrow cast media is delivered in an environment; such as a retail outlet point of purchase display is maintained. Other locations where a system such as this can be employed are in any location where marketing or advertising content is presented in a public space to one person or to small groups of people. It is common that we see narrow cast information displays in point of purchase locations, elevators, entry foyers, and even in mass transit trains and subway cars. For such content delivery to have a maximum impact the content can be targeted to the person that is looking at the monitor. In these circumstances, the system can play content that is of interest to the person there. This targeting of content may increase apprehension and response by the viewer. In most cases of content delivery in these types of displays, the content is simply streamed without consideration for who may be viewing it. The content may be completely off target. For example, in a point of purchase display, the customer could be an older female. Yet the content of the media may for a product that is commonly used only by young males. Extreme examples of this kind of disconnect occurs when the product marketed is related to a life style or behavior that may be considered inappropriate by the viewer. This could lead to a negative experience, and decreasing participation by the consumer. If the content can be targeted to the individual, then interest and participation can be maximized.

One unique feature of the HiPOP system is that the viewer is never aware that the media content is focused to them. The system simply displays the content in a seamless manner, without any indication that a detection of personal attributes is made. The system uses a web cam mounted near a display screen. The camera captures the faces in the space and detects personal attributes. Using the techniques described above, the system determines and classifies the person and then displays the targeted content. There is a limit to the accuracy of the detection. In ideal circumstances, gender detection is 80 to 85% accurate. However, since the system is designed to display the results without the knowledge of the viewer, the viewer does not experience any negative responses. They are unaware that the content displayed is the result of an inaccurate detection of personal attributes.

Another use of the system is in subtle, conceptual and artistic interactive media installations in public spaces. This is useful for interactive or streaming media content in exhibition to be displayed and altered based on the viewer's personal attributes. In Figure 3, the installation depicted alters a still life painting and changes it over time. The result of face detection alters the image according to the viewer age and gender.

In upcoming installations, importance is placed on the detection of mood. As the system software can easily detect facial expressions, the altering the content to match the mood of the viewer can easily be attempted. Current work explores how images can be shifted due to the mood displayed in the viewer in exhibition spaces. Detecting reaction to content and altering the content stream in ways that increase satisfaction is possible. Alternatively, we will explore how mood of the viewer may be affected by the images. There may be ways that various images types can be used to evoke mood shifts within the viewer. In the current installation we are detecting the smile in the viewer's faces. We can track the length of time the viewer is smiling, or other limited facial expressions. The longer one smiles, or alters their body posture; the vibrancy and saturation levels of an image can be adjusted. Other type of images can be streamed based on the visual cues collected. This new work requires "training" of the model to classify the images detected according to the set of groups defined. The library of images is stored in a database with key identifiers associated with mood: smiling, eyebrow position, eye wideness, body poster, and slope of shoulders, head tilt, or other detectable and identifiable cues.

Conclusion

Such systems can provide valuable mechanisms for delivery of media content in public places. One goal in advertising and marketing is increasing interest and engagement of the viewer. By targeting the content more closely to the person based on their own specific attributes, engagement in the content can be maximized. For artistic or conceptual installations, specific goals can be achieved through interaction that is responsive, yet unobtrusive. In the system we have implemented, there is no data or personal information is actually stored by the system. The system simply detects a face or personal cues and defines a classification of the person based on age and gender, and plays a piece of media content. This system creates a subtle responsive interaction that is unobtrusive, yet provides valuable media content that has the potential to increase viewer's engagement in meaning ways.

References and Notes:

1 Viola, P., Jones, M. (2001). Rapid Object Detection Using a Boosted Cascade of Simple Features. IEEE Computer Society Conference on Computer Vision and Pattern Recognition

2 Burges C.J.C., (1998) A Tutorial on Support Vector Machines for Pattern Recognition. Data Mining and Knowledge Discovery 2

3 Sun Z., Yuan X., Bebis G., Louis, S.J., (2002). Neural-Network-Based Gender Classification Using Genetic Search for Eigen-Feature Selection. IEEE International Joint Conference on Neural Networks.

4 Phillip Ian Wilson P.I., Fernandezj., (2006). Facial feature detection using Haar classifiers, Journal of Computing Sciences in Colleges, Vol. 21, Issue 4

5 Freund Y, Schapire R. E. (1995).A decision-theoretic generalization of on-line learning and an application to boosting. In Computational Learning Theory: Eurocolt '95, pages 23–37. Springer-Verlag,

6 Schapire R.E., Freund Y., Bartlett P., Lee W.S., (1997) Boosting the margin: A new explanation for the effectiveness of voting methods. Proceedings of the Fourteenth International Conference on Machine Learning

7 LibSVM: http://www.csie.ntu.edu.tw/~cjlin/libsvm/

8 FERET Database: http://www.nist.gov/humanid/colorferet

9 The MPLab GENKI-4K Dataset: http://mplab.ucsd.edu,

10 Haar-like features: http://en.wikipedia.org/wiki/Haar-like_features

ART ↔ SCIENCE RELATIONALITIES

Olivier Perriquet & Bill Seaman

As science moves away from single disciplines into research that combines multiple scientific fields, we seek to discuss the possibilities of a multi-perspective approach reminiscent of Stenger's *ecology of practices* where science and the arts provide differing perspectives that can be brought into dynamic relationality.

Research and practice that explore relationships between art and science have been around for a very long time. As a subgenre of the artworld, these works and related questions are currently showing a renewal of interest. Are we simply experiencing a transient period when the frontiers between disciplines become more porous and allow for a better mutual comprehension or are we experiencing a real game-changing scenario similar to one of these paradigm shifts described by the epistemologist Thomas Kuhn?

Although initially suggesting the presentation of a taxonomy of the different relations between the Art(s) and Science(s), we have realized in our discussions that such an undertaking would call for a vast study, much broader than what we can actually address here. Nevertheless we will try to articulate a series of operative relations and explore their qualities— this is what we have termed *relationalities*. We have immediately found that each of us represent a quite different understanding of these relationalities and works of art that arise as examples of this juncture. Thus this paper will be an embodiment and synthesis of a dynamic dialogical process, sometimes synthesizing and sometimes pointing to difference. In general both of us see a difference between the practice of Science and Art. If we here adopt a position that does not take for granted that art and science are simply *two different names for the same practice, approach or activity*as sometimes claimed by the proponents of Art-Science bridging, we also believe that these domains of inquiry, seen quite separately by default, can sometimes be brought together when a conviction is established that the disparate pieces can be merged in the service of a new practice.

There has been a certain dose of play in our approach. We both believe this component is common to both art and science. Aspects of creativity are also central to both but are manifested in very different ways in general as part of their practices e.g. in science creativity might become manifest in how one approaches or frames a research problem. This work should be considered a stepping stone toward a more systematic undertaking. We have ended-up here with an initial collection of relationalities between Art and Science that one might call variations on a theme. We seek to let these entries talk and negotiate between each other, exemplifying a dialog between shots from different angles or perspectives. Drawing on Stengers' *ecology of practices,* [1] one might see here an ecology of co-existing relationalities. We typographically coined Art ↔ Science to encompass a wide range of possible relations.

Art (=⊇∩≠≤≅) Science?

Having in mind a target rubric Art ↔ Science, we posit a series of overarching concerns explored under this label. A seminal book outlying one period of works is the late Stephen Wilson's Information Arts and

related website. [2] Here Wilson provides a unique set of categories that comfortably intersect with ours below:

- the development of new forms of artificial intelligence and computational practices;
- the exploration of robotics;
- the creation of intelligent environments;
- the exploration of consciousness studies;
- the study of science as it relates to understandings of the body;
- the development of new forms of interface and sensing modalities;
- the creation of new experience focusing on phenomenology, interactivity and intra-activity;
- the exploration of new materials born of scientific inquiry;
- the abstraction of particular material practices in the service of art and architectural production — e.g. biological processes, physics, and nanotechnological processes;
- the exploration of new technologies for artistic purposes — e.g. locative media, virtual reality, augmented reality, etc.;
- the use of game strategies;
- language games / mathematical games and instantiations of knowledge/concepts through play;
- the employment of media archeology / variantology and its relations as art content;
- the mining of the history and philosophy of science as subject matter;
- the exploration of databases and/or data mining;
- the employment of visualization strategies and/or the abstractions thereof;
- the use of telematic and locative potentials;
- the interest in emergence, generative strategies and dynamic/non-fixed works of art;
- works of social and cultural critical reflection focusing on scientific issues;
- political reflection critiquing scientific research;
- creativity and innovation arising out of scientific inquiry.

Each of these categories can easily be populated with a group of examples. A question that naturally emerges is whether we encompass more or less any form of Art in general, in terms of Art ↔ Science practice or not. Our short answer is no: when art is informed by science by using its materials, technologies and paradigms it expands the possibilities of creation (e.g. using new materials created by physicists or scientific concepts) and simultaneously becomes tinged with what we might call a scientific *color*.

Our question actually bifurcates: (1) can a given work be of art and of science at the same time - Seaman believes yes, where Perriquet is much more circumspect; (2) can 'any' work be described as an Art ↔ Science work - we would both say no. The physicist and philosopher Lévy-Leblond raised an interesting negative voice and argued in a recent essay [3] that the artistic approach and the scientific approach are different in nature and do not consist of a single genre, that this separation is constitutive of each field and condition of its reception. This has also been a debate between us. While Roger Malina, one of the most outspoken contemporary proponents of Art ↔ Science bridgings, published a recent rebuttal to Lévy-Leblond's text, [4] Jacques Mandelbrojt, co-editor of the Leonardo Journal, also remarked that it offers *"a point of view different from that which usually prevails in Leonardo, and it can make [the readers] find their own path by comparing those two points of view."* [5]

We agree with the idea that neither art is a part of science in general, nor science a subset of art, nor science and art are two names for the same activity. But we adopt a softer position, considering that some works may be of art and science at the same time. Seaman defends the idea that, properly contextualized, *"science = proto-conceptual art"* while Perriquet would perceive a mix of genres only in specific

works (but appreciates the hidden and subtle recursivity of Seaman's artistic equation). Seaman's collaborative book with the scientist Otto Rössler, Neosentience | The Benevolence Engine, [6] exemplifies this equation. Seaman calls this approach Recombinant Informatics, exploring a multi-perspective approach to knowledge production. A methodology to investigate the meanings of a mixed-genre work, can be taken up by observing it through artistic glasses as well as through scientific lens (additionally works can also be addressed from other disciplines e.g. the humanities). Wearing these alternating lens provides differing perspectives, resulting in different discourses on the same object or experience.

Works of art-science collaboration may end up in differing output arenas, where the scientist might publish about what they take away from an art-science collaboration in a journal or book chapter, the artist may manifest the result in an exhibition, installation or other form. Concretely, daily scientific productions are mainly publications, addressed to colleagues, and subject to peer-review, whereas artworks are intended for an audience that is not usually made up of artists alone. Framing a work as Art and Science at the same time implies some specificities, such as targeting a public (this is not the usual goal of scientific research) or questioning tacit scientific standard that we may roughly gather under the banner of objectivity. An artist has a right for raising a much more subjective voice: by claiming *"this is an artwork"*, his work becomes indeed an artwork, as per trans-substantiation. There is no similar option in science. Non-orthodox researchers such as Whilelm Reich or Emile Benveniste, among many others, were excluded from the scientific community at their time for non-conformity with the constitutive rules of science. This inclusion / exclusion framework is a bit caricatural: Art also sets tacit rules for the cooptation of its members, and objectivity in science is a complex and widely discussed concept, having a History and assumably different meanings in hard and soft sciences. This example, however, outlines just one variable in the tricky *equation* the community possibly emerging at the intersection would have to solve.

Science ☰ Art ☷ Science ☰ Art ☷ Science ☰ Art

Art seems non-linear in its historical progressions. Scientific knowledge, in comparison, is cumulative, there is a notion of progress that is not so pregnant in art. This point could be discussed, though: one cannot address the question of randomness in art after the drippings of Pollock or the question of the unconscious after the works of the surrealists as if nothing was already done. Whether we call it progress or not is a subtle debate, but at least an artist knows that he/she does not start from scratch. History plays an important role in art, in appearance maybe more so than in science. A physicist, a mathematician or a biologist may be trained only with recent formulations of physics, math or biology and have only a reduced knowledge of the History of his discipline (we imagine that the revolutionary figures, in contrast, always know the History of their science). Art and Science practices must contend with this perhaps subtle difference between art and science in terms of progression.

Certainly science has a different epistemological background related to its concrete functioning – the study of knowledge and its methodologies for justifying its belief. We can explore this from multiple perspectives in the writings of Bachelard, Latour, Kuhn, Feyerabend, Popper and Stengers.[7] We here orient our focus on the work of Kuhn, whom we find illuminating for our concern (a critical discussion on the relative positions of the former epistemologists is beyond the scope of this paper). When arguing that science does not explicitly articulate its rules but functions instead according to *paradigms*, Kuhn offers a conceptual apparatus for ongoing change. We might compare this to the notion of the avant-garde in the arts. Normal science, Says Kuhn *"does and must continually strive to bring theory and fact*

into closer agreement, and that activity can easily be seen as testing or as a search for confirmation or falsification." [8]

Where science must uphold strong standards of truth - here labeled falsifiability (Popper's concept) - art is more open in its strategies and relation to the truth. The famous quote *"art is the lie that tells the truth"* from Picasso, illuminates the complexity and perhaps polarity to that of science in terms of the relations that art explores in the domain of practice. Art has this potential to extend the traditional boundaries of Truth and we provide the hypothesis that there is a similar expansion of logical truth which is at stake when in mathematics one thinks of a visual demonstration of elementary geometry or a computational proof in number theory. This conception and the subsequent debate or controversy it stimulates could be compared to the contemporary understanding of what an artwork is, after Duchamp. Witness here Duchamp's ideas surrounding a *playful physics.* [9] While a painting includes the viewer's gaze in its definition, a contemporary proof (as many contemporary artworks) may include the viewer's cognitive faculties within its boundaries. Interestingly, Hans Diebner who has also worked and written exploring art and science relationality, has defined a new approach to scientific inquiry he calls Performative Science. [10] His work explores in part complex systems and suggests that certain results are time-based and not repeatable. He is deeply interested in a proto-hermeneutics. This is an example where the performative notion relevant to the arts functions in the service of scientific inquiry.

(Art → Science) & (Art ← Science)

Scientific knowledge is traditionally organized hierarchically: is it inherent to its nature? For example, in mathematics, it is hard to start teaching to a student what the cohomology of finite groups is, if he/she does not even know what a group is in the mathematical sense. It may simply be difficult to understand the need for the invention of such a structure without a prior manipulation of different kinds of simple operations in various contexts (multiplication on numbers, rotations in geometry, etc.).

Bourbaki, a collective pseudonym standing for a group of mathematicians of the 20st century, wrote a series of books presenting an exposition of modern advanced mathematics. With the goal of founding all of mathematics on set theory, the group strove for rigor and generality. Each volume starts with an introductory explanation: *"The method of exposition we have chosen is axiomatic, and normally proceeds from the general to the particular."* [11] and also, with a possible coefficient of irony (ranging from zero to one, up to the reader's beliefs), *"In principle, it requires no particular knowledge of mathematics on the readers' part, but only a certain familiarity with mathematical reasoning and a certain capacity for abstract thought."* There exists a propensity to organize scientific knowledge hierarchically. Yet, it is interesting to think about how Science might gain from Art at this level: finding a different way to organize and access its knowledge, as well as a means to stimulate insight and new knowledge production through the potentials of association and juxtaposition.

In exploring the relationality of language used in the service of Art ↔ Science Relationalities, language should be understood in the broadest sense: there is an intimate relation between a given language and its potential expressiveness. The limits of language, for Wittgenstein as discussed in the Tractatus, [12] indicate and set the limits of thought, or the limits of a particular world circumscribed by these thoughts. Mathematicians often use words as simple as group, field, action, natural transformation, etc. to name high level abstract algebraic objects: what is at play here is the complexity of the concepts this language embodies (Deleuze and Guattari would rather speak about *functions* in science and leave *concepts* to the philosophers, *affects* and *percepts* to the artists). [13] In general, scientific language seeks

to be precise and monovalent. Language supporting the arts moves from the clarity of art historical and formal definitions to the poetic, having obscure, and polyvalent potentials. The word may also function as part of an image as both an aesthetic object and a linguistic signifier, superimposing signifying domains. In terms of Art ↔ Science collaboration, certain goals related to the construction of a bridging language may be undertaken. Simplifications have always existed in general-public magazines of science or in lectures intended for a wide audience, but the close interaction with scientists offered to artists in residency in scientific laboratories may lead them to function at times as bridges with a wider or different non-scientific audience; these lucky artists may in return inform their own practice by methodologies imported from science while at the same time illuminate science with an unusual light spot.

Art % Science

Embodying both approaches, Leonardo Da Vinci has become an icon in Art ↔ Science rhetorics because he has been known as a major character for his unequaled contribution both to the sciences and the arts of the Renaissance. A focus on Leonardo's work confirms that History is an important factor in the study of Art ↔ Science bridgings. Leonardo lived a long time before the modern and contemporary conception of science, now concerned with falsifiability and reproducibility of experiments, ie. at a time when the operational concept of objectivity was not yet normalized by an advanced meta-discourse on scientific practice, combined with the intensification of scientific and technological productions. It is interesting to think how an artist like Leonardo functions today in relation to our contemporary conception of the image: *"Another unusual feature in Leonardo's writings is the relationship between word and picture in the notebooks. [...] Leonardo gave absolute precedence to the illustration over the written word in his teaching method. Hence, in his notebooks, the drawing does not illustrate the text; rather, the text serves to explain the picture. In formulating his own principle of graphic representations — which he called dimostrazione (demonstrations) — Leonardo's work was a precursor of modern scientific illustration."* [14]

We understand and believe that Leonardo's work, rather than being a mere discovery of illustration in science, may have been precursory to scientific visualization as we conceive today: the art of gaining insight into a problem by visual means. Taking data visualization as an example, we realize this form of practice can fall within the Art ↔ Science spectrum of relationalities where one may either work on an abstraction of data visualization with the intention of creating a work of art or may draw on art and design concepts to make a more effective display of scientific informations. Visualization not only relaxes the mind from getting lost in too much abstraction, but helps shape a given problem along particular lines of thought, that, when cognitively dismantled into understandable units by the viewer's eyes and brain, provides what Leonardo called *dimostrazione*. It's worth remarking that science might sometimes still call this methodology a demonstration, keeping the dual and ambiguous meaning of *concrete representation* and *logical proof*.

The intrusion of such methodologies from outside of science, reminds (and provides an example to) the strong encounter of Art and Science claimed by Malina, who states: *"[...] the history of science does not follow a logical path of increasing completeness. Instead the history of science is punctuated by the introduction into the scientific methods of ideas and methods from outside of science. The scientific method itself evolves. Facts, theories and methods which would not have been considered scientific a hundred years ago, are now mainstream science. … I argue that one of the reasons for encouraging the interac-*

tion of art and science is to facilitate the migration of ideas and methods from outside of science into science. I call this the 'strong case' for art-science interaction." [15] One can imagine a dual strong interaction where the intrusion of methodologies from outside of art also transforms artistic practices.

Art ☆ Science

Having reached the conclusion we find ourselves just at the beginning of a vast study. We certainly hope that we have in part reflected the plurality of practices involved here and started to articulate a multiperspective approach which allows for a circle that encompasses many foci and multiple points of view. At some point this appears to be a paradoxical undertaking, and probably we are pulling out the rug beneath the very footing that we are currently bootstrapping, by embracing this multiplicity of perspectives. But each person involved in Art ↔ Science practices positions *themself* differently and our remote goal is to embrace these inner and outer diversities.

References and Notes:

1. *I. Stengers, "Introductory Notes on an Ecology of Practices," in Cultural Studies Review 11, no. 1 (2006): 183-196.*
2. *S. Wilson, Information Arts (Cambridge, MA: The MIT Press, 2002).*
3. *J.M. Lévy-Leblond, La Science (n')e(s)t (pas) l'Art (Paris: Hermann, 2010).*
4. *R. Malina, "Is Art-Science Hogwash?: A Rebuttal to Jean-Marc Levy Leblond," Roger Marina's Web Site, 17 April, 2011, http://malina.diatrope.com/2011/04/17/is-art-science-hogwash (accessed June 29, 2011).*
5. *J. Mandelbrojt, "Review on 'La Science (n')e(s)t (pas) l'Art: Brèves Rencontres,'" Leonardo On-Line, April 1, 2011, http://www.leonardo.info/reviews/apr2011/levy-leblond_mandelbrojt. php (accessed June 29, 2011).*
6. *B. Seaman and O. Rössler, Neosentience: The Benevolence Engine (Bristol-Chicago,IL: Intellect Press, 2011).*
7. *See in particular B. Latour, Science In Action (Cambridge, MA: Harvard University Press, 1987) and I. Stengers and I. Prigogine, La Nouvelle Alliance (Paris: Gallimard, 1979).*
8. *T. Kuhn, The Structure of Scientific Revolutions (Chicago, IL: University of Chicago Press, 1962).*
9. *M. Duchamp and R. Hamilton, The Bride Stripped Bare by her Bachelors, Even: A Typographic Version (New York: J. Rietman, 1976).*
10. *H. Diebner, Performative Science And Beyond (Wien: Springer, 2006).*
11. *N. Bourbaki, Elements of Mathematics, Algebra 1 (Paris: Hermann, 1966).*
12. *L. Wittgenstein, Tractatus Logico-Philosophicus (New York: Humanities Press, 1961).*
13. *G. Deleuze and F. Guattari, What is philosophy? (New York: Columbia University Press, 1996).*
14. *Ludwig Heinrich Heydenreich, ed., "Leonardo da Vinci," History Channel's official Web Site, http://www.history.com/topics/leonardo-da-vinci (accessed June 29, 2011).*
15. *R. Malina, "The Strong Case for Art-Science Interaction," Vectors' official Web Site, http:// vectors.usc.edu/thoughtmesh/publish/120.php (accessed June 29, 2011).*

YOU HOLD THE CAMERA NOW: AN ACTION RESEARCH CASE STUDY OF PRE-KINDERGARTEN TRANSMEDIA NARRATIVE DESIGN

Gabriel Peters-Lazaro

This paper presents findings from a pilot research project called the Junior Audio-Video Club. Through an account of our experimental pedagogical approaches this paper aims to identify key insights and challenges to the pursuit of early childhood media arts education, and to explore the relationship between art practice and research.

Student participants in the Junior AV Club collaborate on a video editing project. Copyright University of Southern California.

"It's like somebody telling a story, except it's on a screen." This observation about the relationship between movies and storytelling was made by a four-year-old student at the outset of a project called the Junior Audio-Video (AV) Club undertaken by a group of media arts scholars and practitioners at the Institute for Multimedia Literacy in the fall of 2009. A research and teaching unit within the University of Southern California's School of Cinematic Arts, the Institute for Multimedia Literacy, or IML, is dedicated to promoting media literacy within networked cultures at all levels of education. The Junior AV Club, an ongoing action research project investigating how digital media tools facilitate learning for early

primary students within a pedagogical framework based on computational literacies, represents the IML's first foray into pre-K and early primary education. As an IML staff person and PhD student in Media Arts and Practice (iMAP) at USC, my role within the Junior AV Club has been that of curriculum designer, lead instructor and researcher. I am in the process of expanding the research goals of the project and making it the basis of my dissertation work.

This paper is an "in-progress" introduction to the project; it is not a comprehensive report of findings and conclusions as we have not yet reached that phase of the process. At this stage we are focused on a practical approach to developing classroom interventions and have yet to assess the outcomes of those interventions. I share our work at this phase as an example of how the processes and skills of an arts practice background may contribute to research endeavors.

The Junior AV Club was inspired by a 2009 evaluation of the Ready To Learn Initiative that found positive effects on the basic literacy skills of preschoolers when exposed to media rich educational materials. The IML partnered with a neighboring preschool and conducted a one-day workshop in digital storytelling and recombinative narrative with a group of 18 four- and five-year old students. The success of that pilot workshop led us to develop and implement a 10-week project in the spring of 2010.

Students came to the IML each week in groups of 10 for 90-minute sessions on transmedia digital storytelling. An early lesson dealt with still image production, analysis and categorization. Students learned to take photos using digital still cameras. Once students had their photos loaded onto IML computers, they each chose three pictures to arrange on a single page with a sentence of text (dictated to an adult) explaining their choices. Compositions included groupings based on color, personal preference, and the idea that the same thing can look very different depending on how close or far away the camera was when the picture was taken.

This lesson illustrates our pedagogical approach to the Junior AV Club in a number of ways. For one, it created an opportunity for practical media production skills in a context that promoted critical media literacy. Additionally, the language of visual literacy that we introduced to describe and categorize images tied in to the traditional literacy skills students were learning in their regular classroom, supporting concepts of patterning, seriation and classification. The activity also illustrated a common student relationship with technology: students expressed excitement about using digital cameras and shared anecdotes about their prior experiences using or observing such technologies in familial contexts.

Since completing that first 10-week session and reflecting upon our experience, we have gone on to conduct two more iterations of the Junior AV Club in the summers of 2010 and 2011. We refined our lessons and activities, expanded our approach to include computational literacies and game design alongside visual literacies and storytelling, and have focused as much on how we teach as what we teach. We strive to create a learning-rich environment facilitating challenge-based peer-driven inquiry where technology is a naturalized part of the landscape.

In the latest iteration of the Junior AV Club we examined how iPad tablet devices function as learning tools and encourage computational thinking. We found that iPads were useful for information recording and sharing between students just learning to read and write, and that well designed iPad apps could be effective models of abstract concepts such as computer programming. However, we found that many iPad apps encouraged single-user experience at the expense of group cohesion and we would like to see development of more apps that can support the creative learning activities of a defined group of local users, creating an effective virtual extension of classroom spaces and activities.

Technology in the classroom is not an answer in itself to the changing needs of educational systems. However, as the affordances of new technologies support novel structures of social interaction, skill sharing and network building, there are opportunities to re-imagine what teaching and learning look like. There is much positive work being done around these ideas, and I am particularly excited by the research, writing and pedagogical examples of Mizuko Ito, Douglas Thomas, John Seely Brown and Katie Salen, along with the field building efforts of the MacArthur foundation in the area of digital media and

learning. Within this investigative space I see a place for the research contributions of arts practitioners and educators, and offer some context about my own arrival within this community as an illustration.

When I first began making documentary video art, I learned by instinct and self-guided research. I later expanded my self-developed processes and skills with a formal arts practice education, earning an MFA in film directing and production from UCLA.   But my richest learning experiences were those that I pursued on my own. As an arts educator, I strive to create circumstances in which students can discover and strengthen their own vision and creative process rather than presenting them with a predetermined set of rules.

I came to the research process of the Junior AV Club much as I did to the art practice process, working from a desire to do, to explore and to learn. This openness to experimentation carried over into my interactions with the students through a willingness to adapt our approach to their feedback and needs rather than try to mold them to a preconceived plan and concept of how an activity was supposed to go. This flexibility and openness to the reality unfolding in front of and around me has always been key to my successful creative experiences. We carried out our research like art practice, and it turned out that one of our main research goals was to learn how best to structure learning that way too. Moving forward with the project along the iterative feedback loops of an action research system, I hope to enlarge the Junior AV Club's community of collaborators, to incorporate more expertise and methodology from education research, and to develop functional tools and publications that can benefit communities beyond the laboratory space of the IML.

References and Notes:

Penuel, W. R., Pasnik, S., Bates, L., Townsend, E., Gallagher, L. P., Llorente, C., and Hupert, N, Preschool Teachers Can Use a Mediarich Curriculum to Prepare Low-income Children for School Success: Results of a Randomized Controlled Trial (New York and Menlo Park, CA: Education Development Center, Inc., and SRI International, 2009)

Mizuko Ito, et al, Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media (Cambridge, MA: MIT Press, 2010)

Douglas Thomas and John Seely Brown, A New Culture of Learning: Cultivating the Imagination for a World of Constant Change (Lexington KY: CreateSpace, 2011)

*Katie Salen, Robert Torres, Loretta Wolozin, Rebecca Rufo-Tepper,
and Arana Shapiro, Quest to Learn: Developing the School for Digital Kids (Cambridge MA: MIT Press, 2011)*

PURSUING THE UNKNOWABLE THROUGH TRANSFORMATIVE SPACES

MAJA PETRIĆ

My work is about changing the perception of space in function of art. Therefore, the subjects of my work are perception, space and, art. To change perception, I study sensation, experience, and phenomenology. To create spatial situations, I practice designing spaces, fabricating structures, manipulating materials, and integrating lighting and audiovisual systems. The core of my artistic research is the pursuit of the unknowable— the sublime.

Fig 1. no caption

Fig 2. "As It Is Cracking". Maja Petric, 2010, Light installation for a room, Seattle, WA, US © 2010 Maja Petric

Fig 3. "The Snow Storm—Steam Boat off a Harbour's Mouth Making Signals in Shallow Water, and Going by the Lead". Joseph Mallord William Turner, 1842. Oil on canvas; 36 in x 48 in., Tate Britain, London, Turner Bequest

Historical Background of the Sublime

The core of my artistic research is the sublime. To illuminate my artistic engagement, I will elaborate on the history and theory of the sublime. While the term has had a long life full of passionate relationships with philosophers and artists who have attempted to reveal its essence, that has not led to a unified definition of its meaning. "What is the sublime? It does not appear to have been defined. Is it a figure of speech? Does it spring from figures, or at least from some figures of speech? Does the sublime enter into all kinds of writings, or are grand subjects only fit for it?" (La Bruyère).

The first mention of the sublime is found in writings of Longinus, the Greek rhetorician and philosopher of the Neoplatonic school. In "On the Sublime", which is thought to have been written between the third and first century AD, Longinus discussed the sublime as something great, elevated, or lofty that manifests itself in what is beautiful. In the seventeenth century, British philosopher John Dennis expanded Longinus' definition by introducing horror as an additional aesthetic quality that can create the sublime. After embarking on a journey across the Alps to Italy John Dennis described the term as "delight that is consistent with reason," and "pleasure to the eye as music is to the ear," but also "mingled with Horrours, and sometimes almost with despair" (Pack and Dennis).

Several years later, British philosopher Edmund Burke proclaimed that horror is not only another potential source of the sublime, but the most potent one. In 1756 he published "A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful". Burke wrote: "Whatever is fitted in any sort to excite the ideas of pain, and danger, that is to say, whatever is in any sort terrible, or is conversant about

terrible objects, or operates in a manner analogous to terror, is a source of the sublime; that is, it is productive of the strongest emotion which the mind is capable of feeling… Terror is in all cases whatsoever, either more openly or latently, the ruling principle of the sublime" (Burke).

Prominent German philosopher Immanuel Kant followed Burke's enquiry in 1790 by writing a theory of aesthetics that was published in Critique of Judgment. In the chapter "Analytic of the Beautiful", Kant disassociated the beautiful from the sublime. While the beautiful is concrete, he explained "it is connected with the form of the object." And, the sublime is intangible, "it is to be found in a formless object" (Kant). Beauty can be reasoned, but to experience the sublime it is necessary to go beyond reason and employ sensibility and imagination. The ability to transcend reason by fusing it with the nature of senses is the vehicle of the sublime that Kant called a "supersensible substrate." He associated this ability with individuals who pose both superior mindfulness and superior sensibility of the body.

For Kant sublime is not an object—it is a state of mind we must enter that enables us the experience. We experience the sublime when our imagination fails to conceive the greatness of events solely by means of reason but compensates for this failure with pleasurable sensations that can be manifested through synthesis of senses with virtue of reason. Sublime as an experience is independent of any conceptualization or perception by the human mind. It is a thing-in-itself that Kant called the noumenon, postulated by practical reason but existing in a condition which is in principle unknowable.

Kant's theory prompted even more vivid discussion about the nature of the sublime, which created new possible frameworks for the subject. None of these were accepted as a unique model of the concept through which they demonstrated the impossibility to frame the sublime. This only confirmed Kant's definition of it as the unknowable. So essentially if what we experience is unknowable, the question is how do we experience the unknowable. All the previous theories depicted it as a dichotomic experience that is both wonderful and terrible.

Getting to Know Unknowable as Both Wonderful and Terrible

Multiplicity of that experience, the dichotomy between bliss and horror, beauty and ugliness, pleasure and pain, comfort and torment, divine and hell as distinct instances of the single sublime that can be experienced through integration of cognitive and sensory ability is the most persistent in religious mythology. Religions that promote transcendence through light and darkness have illustrated the sublime as the crossing point towards the numinous, the presence of a divinity.

According to the German theologian Rudolf Otto, crossing the bridge of the sublime is encouraged both by mysterium tremendum et fascinans ("fearful and fascinating mystery"), the pains and terrors overwhelming those who have arrived affront of God, and "nostalgia for paradise" (Otto), aching desire to reach the abode of perfection. In Christianity, the God is light, but the God is also darkness. "And the light shineth in darkness; and the darkness comprehended it not" (John 1:5).

Contradictions of the sublime have been depicted in art since the beginning of art history. These works differ in a degree of simulating and emulating the experience of the sublime. For example, Dante's "The Divine Comedy" uses the narrative to create a representation of soul's journey through Inferno, Purgatorio, and Paradiso. It simulates, projects the idea, of experiencing Dante the Pilgrim's journey. To a de-

gree, it also emulates the actual feeling of being on a path from hell to heaven. It can make a reader experience the poem as if they were the first person of the poem. But it is predominantly a representational narrative of the sublime simulated in an afterlife of any everyday sinner.

Myths of heaven and hell have functioned to interpret the world and its counterparts, but also to entice the audience into experiencing its parts. The enticement into the fearful and blissful mystery is where the art comes in. Postmodern French philosopher and literary theorist Jean-François Lyotard recognized avant-garde art as a novel opportunity for accessing the sublime. He argued that the nature of avant-garde modern art has the unique potential to manipulate the balance of senses, reason, and emotion in a manner that results in a sensation of pleasurable pain. My further investigation is in practice of art that carefully entices senses, reason, and emotion in a way that results in an experience of the unknowable.

Works of art that predominantly emulate the experience of the sublime are aligned with twentieth century French philosophy in the domain of post-structuralism that views the structural relationship between the signifier and signified as inseparable but not united. In the artistic discourse the structure creates nonlinear meaning, and the audience replaces the author as the primary subject of inquiry. These ideas extend to the philosophical concept of phenomenology that focus on the "first person" viewpoint, which can then be examined as phenomena that not only appears to "my" consciousness, but to all consciousnesses. According to German philosopher Edmund Husserl, "the synthesized experience is what constitutes total human knowledge."

One of the first artists exploring the phenomenological experience of the sublime was English Romantic landscape painter Joseph Mallord William Turner. His most notable painting, "The Snowstorm: Steamboat Off a Harbour's Mouth Making Signals in Shallow Water" (1842) portrays a ship in distress off the English coast with a high degree abstraction, asymmetrical composition, and monochromatic palette. The painting documents the ship caught in the storm by depicting the experience of witnessing the ship in the storm, instead of merely realistically reproducing the look of the scene. The painting not only informs us about what happened to the steamboat at the Harbour's Mouth during the snowstorm, but it also physically immerses us in the event. It is a beautiful and terrifying visceral experience, creating an example of the sublime in painting.

Several centuries after Turner, vision as the highest in the historical hierarchy of senses was slowly making space for other senses—and a fuller sensory experience. The industrial revelations of the twentieth century made an impact on art and how it is experienced. Artists including Anish Kapoor, Mark Rothko, Bill Viola, and James Turrell marked the twentieth century as an age of expanding our sensing apparatus to experience the sublime. Through their abstract but integrated use of materials, space, color, light, and image, they excite our senses and intrigue our minds to the point of reaching the essence of the unknowable.

The technological age is allowing for more multisensory engagement. My interest is in exploiting those technological advancements that can fuse perception of senses and add to the phenomenological experience of my artistic intention of presenting the presence of the unpresentable. "My perception is [therefore] not a sum of visual, tactile, and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once (Merleau-Ponty).

To be fully present in the world, one needs to use all available senses and intimately interact with the environment using their eyes, nose, ears, and skin. Only through receptiveness of the entire sensing mechanism is it possible to have a profound sensation of the place that can then be emotionally and cognitively processed into a meaningful experience. In the context of art, maximized engagement of the senses can direct memory and imagination into a place where the sublime can be experienced.

Pursuing Both Wonderful And Terrible Through Transformative Spaces

I was born and raised in Croatia during the violent fragmentation of Yugoslavia. It is then that I became preoccupied with using art to transform the traumatized sense of the surroundings. My work is about changing the perception of space in function of art. Therefore, the subjects of my work are perception, space and, art. To change perception, I study sensation, experience, and phenomenology. To create spatial situations, I practice designing spaces, fabricating structures, manipulating materials, and integrating lighting and audiovisual systems. The core of my artistic research is the pursuit of the unknowable— the sublime.

My interest is not to define the sublime. Critical history has proven that the sublime cannot be precisely put into words, just as the meaning of life is inherently unknowable. Nineteenth century Danish philosopher, theologian, and psychologist Søren Kierkegaard argued that logic of the objective knowledge and rational belief is unimportant to existence. If the deity could rationally be argued, existence of the supernatural being would be unimportant to humans. It is because God cannot rationally be proven that his existence is essential.

The sublime, as an agnostic term, cannot be made into an object of knowledge through language, reasoning, logic, and concepts. But it can be experienced. Since it is unknowable but can be experienced, it is profoundly valuable to experience it. My interest is in the experience of the inherently unknowable sublime. This experience has been described both as awe and terror. My interest is in the division and range between two mutually exclusive, opposed, or contradictory sensations as distinct instances of the single sublime. Therein lies the opportunity for the multiplicity of an experience, which can than also be created in art.

My approach combines traditional and progressive principles of spatial design fabrication, lighting design, audiovisual systems, and multisensory devices. By utilizing technological advancement in traditional mediums and untraditional integration of those mediums I aim to discover, interpret, and develop novel body of knowledge for enhancing the multisensory spatial experience that provides access to the sublime in the purpose of art.

One of the first projects that clearly illustrate my fascination with transforming the poetic experience of the space is the "outSIDEin". It is an interactive light installation that was created in year 2004 to transform the atmosphere of the shattered pedestrian tunnel at New York City Subway's 191st Street station of the number 1 train. There, I use artificial light to simulate a striking natural effect of light emanating from the sky, which is projected through false cracks of the ceiling in the pedestrian tunnel. Lights are programmed to imitate the color and intensity of the daylight outside of the tunnel. When the weather outside is very sunny, the light projected inside through the cracks is bright and yellow. When the weather outside is foggy, the light is blue.

The "outSIDEin" project has been an inspiration for further investigation about the live transformation of the spatial experience. In light and video installation "As It Is Cracking", the wall in the room cracks in real time. As the wall cracks, lights and video appear through the cracks to create an experience that ranges from frightful to pleasurable. Daunting cracking of the wall in real time happens over the course of eight hours. Light and moving images appearing through the cracks simulate slow and steady change of daylight. This change is interrupted by sudden and startling appearance of lightning.

In 2009, I have collaborated with a choreographer Jennifer Salk in a dance performance "The Eyes of The Skin". We explored the often twisted and delicate nature of tenderness, which is defined as a tendency to express warm, compassionate, or affectionate feelings. But in medicine it stands for pain or discomfort when an affected area is touched. By definition, tenderness is both a pleasure and pain as a result of susceptibility that is being defined by juxtaposition of the two opposed characteristics. I focused on the dichotomy of tenderness that ranges between pleasure and pain and as such relates to her research of the sublime and the multiplicity of the sublime experience. My ideas were combined in a form of the deteriorated wall that covers the north wall of the stage and that cracks over the course of a performance. As the wall is cracking, the light appears through the cracks and changes color and intensity in response to dancer's behavior and dance narrative.

In the mentioned projects, the crack is an instigator of the spatial transformation that becomes both wonderful and terrible. As such it is a symbol and emulation of the sublime that can be captured only through the personal sensing mechanism. Capturing the presence of the unknowable remains to be the goal of art.

References and Notes:

Otto, Rudolf. *The Idea of the Holy.* Oxford: Oxford University Press, 1923.

Auden, W H, and Søren Kierkegaard. *The Living Thoughts of Kierkegaard. The living thoughts library.* New York: D. McKay, 1952.

Burke, Edmund. *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful.* London: Routledge and Paul, 1958.

Deleuze, Gilles. *The Fold: Leibniz and the Baroque.* Minneapolis: University of Minnesota Press, 1993.

Kant, Immanuel, and J. H. Bernard. *Critique of judgment.* New York: Hafner Pub. Co, 1951.

La Bruyère, Jean de, and Henri Van Laun. *Characters. The Oxford library of French classics.* London: Oxford University Press, 1963.

Longinus, and William Smith. *Dionysius Longinus On the sublime.* London: Printed for William Sandby, 1742.

Lyotard, Jean-François. *The Postmodern Explained: Correspondence, 1982-1985.* Minneapolis: University of Minnesota Press, 1993.

Merleau-Ponty, Maurice. *Phenomenology of Perception*. New York: Humanities Press, 1962.

Pack, Richardson, and John Dennis. *The whole works of Major Richardson Pack late of Bury St. Edmonds in the county of Suffolk*; in prose and verse. London: Printed for E. Curll, 1729.

For the expanded reference list contact the author.

BIG BIRD IS WATCHING YOU! ART, ACTIVISM AND TECHNOLOGY IN THE PUBLIC ARENA

DENITSA PETROVA

Many contemporary artists working in the public arena have recognised the potential that the rapid development of digital media technologies presents. This paper discusses the potential of art and technology collaborations stimulated by the continuous transformation of our cities. It explores the intersection between art, activism and technology as a new art practice used as a tool for creating situations prompting cultural change.

Introduction

Today, George Orwell would have felt like a prophet if he was able to walk the streets of London and see the thousands of CCTV cameras following, and recording, pedestrians and vehicles. Perhaps he would have been inspired to write another novel if he knew how technology had progressed, allowing satellites to track down car license plate numbers and mobile phone signals to within a matter of meters of their geographical location, all from outer-space. Some people now believe that most of Orwell's predictions are now being integrated into our free society. Finger prints, retina recognition, phone taps – these are all now mechanisms that governments use to manage countries and people. Do we now live in the modern day Oceania? [1]

Perhaps Orwell was right - war really is peace; we simply need to look back to the not so distant Cold War decades to realize that fear was keeping peace on this planet. Globalization impacts our lives and is widening the income gap between the rich and poor. This is strongly reflected in public space, which is now becoming more increasingly managed and controlled. Perhaps the reason that we have so many brain-numbing reality TV shows today is because governments and media are embracing the mantra that ignorance is strength. This is strength for the powerful economic conglomerates, the financial corporations, insurance companies and banks. Could the TV Show *Big Brother* be the present-day *Newspeak*, that makes "all other modes of thought impossible?" [2] Because whilst we are watching *Big Brother*, our minds are occupied and we do not question what is really happening with the world around us or what is happening with the public space that is meant to belong to us, the public. But is this just a camera trick?

What is the role of the artist today in relation to the challenging political, social, and economical climate? The Dutch painter Piet Mondrian thought of the artist as someone whose position is humble and who is "essentially a channel." [3] Mondrian lived and worked at the end of the 19th and the beginning of the 20th century, the dawn of Modernism. He was interested in theosophy, a movement launched in the late 19th century, which was centered on the importance of the interconnectedness of the whole universe. Perhaps this fact relates to Mondrian's description of the role of the artist as a channel - a channel of ideas, a link between real and imaginary, or as someone who is able to reconcile their creative pursuits with their understandings and believes about life.

Precisely, this role of the artists as a channel of ideas reveals itself in the projects discussed later in this paper. However, the artist today is more than a generator of objects or channel of ideas. Many artists

today are becoming catalysts for political, social, and cultural change. This notion is strongly reflected in the concepts of various activist art practices, which are most commonly seen outside the gallery space as their creators are trying to reach a larger audience. These artists are trying to point out what is happening in the public space today; their strategies are becoming more vocal and effective and many art groups and individual artists are working anonymously in order to deliver their true message.

There are various ways in which activists interfere with our physical and social environment today. This paper presents a selection of examples which illustrate, in a witty and playful way, the tactics and methods used by artists and art collectives. This essay examines the works of contemporary artists and art collectives who use the power of technology to publicly engage political, social, and community issues.

One may rightly ask the question, "Why do we call these practices art?" It could be "community practice", or perhaps "political action", or none or all of the above. The majority of these works are project, rather than object, orientated. Nina Felshin describes it as an activist cultural practice with "…one foot in the art world and the other in the world of political activism and community organizing." [4] In his book, *Art Matters*, Peter de Bolla suggests that our attention should not only be directed at the obvious aesthetic values of the artwork but at our experience of it. He also notes that "…the great value of art lies in its power to prompt us to share experiences, beliefs, and differences." [5] Perhaps we can find the meaning, value, and significance of activist art not in the art object itself but in the idea of conveying a message, provoking thought, and creating a dialogue not only between the artists and their audience, but between the audience members themselves as well.

Who can initiate, create, or take part in activist art projects? Anyone can. Not being an artist does not mean that a member of the general public can not initiate or participate in activist activities. At the same time, artists are part of the public and they have as much right to intervene with the public space as anyone else. These projects and actions are representations of the messages that the artists are hoping to spread. The outcome of these practices is not necessarily the actual artwork, but rather a passage to the particular idea that the artist had in mind. Furthermore, these practices are inspired not by the intimate world of the artist but are focused on what is happening in our public space today.

John Henry Strikes Back

Often, activist art projects are collaborative and done anonymously. They have no specific author and, most often, are the result of teamwork between artists, architects, programmers, engineers, and activists. The individual authorship is not important, especially as the number of the members of the art collectives is never a constant. Additionally, the vast development in technology has contributed to the decreased notion of expression of the individual. As described by Marchal McLuhan, "…as new technologies come into play, people are less and less convinced of the importance of self-expression. Teamwork succeeds private effort." [6]

Founded in 1998, the Institute of Applied Autonomy (IAA) is an art group dedicated to creating activist projects which call for social or political change. Most of the IAA members are anonymous, not simply because some of the promoted works are conducted 'guerrilla style', but because the authors are trying to keep public attention focused not on the artist, but on the problems that the work is dealing with. They use the name John Henry as a collective nickname which unites a group of artists, engineers, and activists under the idea of using technology to raise pubic awareness on social and political issues.

One of their more recent works, the *GrafittiWriter*, was developed in response to the increased government funding for military robotic development. By 2030, the Pentagon is planning to replace about 30 per cent of its armed forces with robots, or as Professor Bill Smart, one of the project leaders from Washington University, calls them "autonomous systems." [7] Powerful robots will lead human soldiers into battle within the next decade. In response to these plans, The Institute of Applied Autonomy developed the *GraffitiWriter.* The robots can operate in parks, shopping malls, and buildings and its purpose is to disseminate subversive and politically controversial texts. With the help of an operator and a remote control, the *GraffitiWriter* sprays linear messages on the ground. In 2004, the robot was set up to take part in the Grand Challenge, a military robotics event organized by the research and development office for the U.S. Department of Defense. GraffitiWriter's mission was to print Isaac Asimov's First Law of Robotics – "A robot may not injure a human being…" – at the starting line of the event.

In a similar fashion, in 1993, the art collective RTMark conducted a controversial act of product hacking by developing a project called *Barbie Liberation*. The mission of the project was to challenge gender stereotypes in the children toys industry by performing voice surgery. The project involved swapping the voice boxes of Barbie Dolls and GI Joe toys in a number of toy stores in the United States. The toys were returned to the stores with switched voice clips and, without the knowledge of the staff, were released back on the market. Many children heard their Barbie dolls shouting "Vengeance is mine!" and GI Joe soldiers saying "Let's plan our dream wedding!" The website of RTMark provides a manual with a step-by-step guide how to perform the voice surgery. Since then, Barbie has evolved and embarked upon many different professions such as becoming an astronaut, doctor, police officer, and even a presidential candidate.

One Nation under CCTV

In 2001, The Institute of Applied Autonomy initiated a project called *ISee*. It was created in response to the vast growth of CCTV surveillance of public spaces. The web-based application was first developed for the streets of Manhattan mapping the locations of the cameras. Via the *ISee* website, anyone can generate a route with the least number of cameras watching them and walk around the streets without the uncomfortable feeling of being filmed without permission.

Research has showed that most CCTV cameras in New York were placed in the financial district of Manhattan but not in the poorest and most unsafe areas of the city. [8] One has to wonder if the cameras are actually keeping people safe or protecting the property of the wealthiest. Another study done in the United Kingdom revealed that CCTV cameras in Glasgow's city center did not actually have a significant impact on crime in the area. [9] Projects such as *ISee* do not question the use of video surveillance to prevent crime as a whole but rather its effectiveness. Furthermore, the authors are trying to draw attention to the fact that many of the public space cameras are actually privately owned by banks and stores, which undoubtedly makes the recordings private property.

Created in 2007, Celine Shenton's *Bird City* also tackles similar issues. The project consists of series of bird houses for urban areas. The birdcages look like surveillance cameras but, in fact, they really offer refuge to birds. Shenton installed real video cameras inside the bird houses which were able to broadcast video of the bird's life to the nearby homes. As an alternative to TV shows such as *Big Brother*, *The Bachelorette* and *Celebrity Detox Camp*, this work offers multiple thought provoking points regarding our dehumanized urban spaces and increasing detachment from nature.

In the same fashion, apart from trying to convey a message, the work of Tad Hirsch's *Tripwire* also offers a real solution to a specific problem. The project is designed for a specific suburban area of California near the San Jose International Airport. Hirsch's custom built sensors were mounted inside coconuts and attached to real trees in the noisiest areas of the neighborhood. When an excessive aircraft noise was detected, the sensors would trigger automated phone calls to the complaint line of the San Jose Airport on behalf of the citizens.

Another public space intervention, involving media memory, is represented in the *Image Fulgurator*. This is essentially a photo hacking project which embeds an image onto the photos of an unsuspecting photographer. The result of this photo graffiti is only visible after the original film has been developed, or after the image is viewed on the camera screen or on a computer.

The *Image Fulgurator* is, technically, a classic photo camera which uses exposed and developed film with images on it. A device inside the Fulgurator detects when a flash goes off and automatically projects the image onto the object which is being photographed. The photo intervention is particularly effective when used in public spaces that have particular political significance. The author of the project, Berlin-based artist Julius von Bismarck, sees it as a piece of art which could be a dangerous attack on the media.

Mash It Up

The rapid development of technology during the past few decades, plus the open access to information facilitated by these new technologies, has created a new public space for politically orientated dialogue – the internet. The internet is also a creative space, an enormous arena for social interaction, and at the same time, an open canvas for work and collaboration.

The term "mash-up" originates from the hip-hop music genre and represents a specific style of mixing two or more songs. In technology, the concept of combining different software is not new. Internet "mash-ups" consist of combining information and services of different websites in order to create a new project. Most commonly, internet mash-ups use a combination of online maps, such as Google maps, and mapping locating service applications.

A creative mash-up that locates informal play spaces in Sao Paolo was created by the Spanish art collective, Basurama. As part of a research project, the group developed an interactive map of urban spaces which could also be used as informal playgrounds. The images can be uploaded by any member of the public, and Wikimap reveals outlaw street football pitches and improvised playing fields. The mission of the art collective was not only to provide information about these areas but to also bring about a discussion on topics relating to the re-use and reclaiming of city spaces.

Another creative use of data available on the web is represented in a video project initiated by a Tunisian cyber activist and blogger called "Astrubal". He created a video work in response to the claims of the Tunisian Government that the their president has only left the country three times in the past few years as he was preoccupied with important government matters. Astrubal investigated flight information available on the internet relating to the Tunisian presidential airplane. He collected images from various mapping websites, which identified the plane at specific locations and at certain times. The result of this investigation, represented in a video, proved that the president has been out of Tunisia far more often than stated and not on government matters, but on holidays and shopping trips, which are

funded by Tunisian tax payer's money. This project is a fantastic example of creative use of online data, which is gathered collaboratively by various internet users and combined in a video work, available through video sharing websites.

Another innovative model of online activism can be found in internet political mash-up sites, such as www.PublicWhip.org.uk and www.TheyWorkForYou.com. These websites provide information on the activities of the members of the United Kingdom Parliament and, more specifically, on their voting patterns, parliamentary debates, and expenses. All of the House of Commons and House of Lords debate transcripts are available online, however, via these websites, each member of the public can view summarized information for their MP and his or her activity without having to browse through hundreds of Parliament pages and newspaper articles. The creators of these projects work on a voluntary basis and their mission is to "...to help bridge this growing democratic disconnect, in the belief that there is little wrong with Parliament that a healthy mixture of transparency and public engagement won't fix." [10]

The internet has come a long way since the 1960's, when it began its existence as a Government project. It now provides various creative opportunities for activist art collectives to share concerns, viewpoints, and, essentially, engage the public in dialogue and actions prompting change. The global net is now a new public arena with enormous democratic potential for political and social action.

Final Thoughts

Patricia Philips defines public art and activist art as inseparable and, "...united in an inherently cooperative model of social-aesthetic practice." [11] According to this notion, art can be defined as "public" based on what it does, but not where it is located.

It is apparent that in the public activist art projects discussed above, the meaning of "public" is identified precisely via the messages that these works are trying to communicate to their audiences. Artists define their own commutative relationship with the public by observing, trying to understand our culture, and by producing works that challenge and provoke emotions; attempting to make us angry, make us happy, or, at least, make us think.

It has been more than 60 years since Orwell wrote:

They were born....they passed through a brief blossoming period of beauty and sexual desire, they married at twenty, they were middle-aged at thirty, they died......the care of home and children, petty quarrels with neighbors, films, football, beer, and, above all, gambling filled up the horizon of their minds. [12]

Have we become more or less concerned with what is happening around us since then? It is perhaps not surprising that in the contemporary urban space, constituted of social and political power, artists and activist groups are trying to engage the public by provoking some kind of response calling for social change or simply raising awareness. I believe that a good artist is one who is aware of what is happening around them and who manages to translate their thoughts using the power of images, objects, technology, text, and performance. Site-specific interventions, product-hacks, and internet mash-ups are offering the public the opportunity to re-examine its relationship with the urban, social and virtual spaces.

I do not attempt to plead that all art should focus on activism or that the artists should only be concerned with political issues. I also think that it is unreasonable to expect that art can resolve major issues in the political or social sphere. What I do believe is that art has the power to help us imagine, think, understand, and care.

Art can be seen as a tool of communication with the other, but also as a tool of relation to the other; a method of conveying a message that otherwise may not be understood. Breakthroughs in technology have had a vast impact on the way activist art projects are initiated and developed. Furthermore, the internet, as a virtual public space, has presented the artists with an opportunity to organize and promote their practices. At the same time, I can't help but wonder if the increased use of virtual space has not affected the way we think about the physical public space. I do, nevertheless, think that being indifferent to our surroundings may put too much power into the hand of banks and corporations and restrict, even more, our right to enjoy the public places that belong to us - to the public.

References and Notes:

1. *George Orwell, 1984 (London: Penguin Books Ltd, 2003).*
2. *Ibid., 343.*
3. *The History of Painters Web Site, "Piet Mondrian," http://www.historyofpainters.com/mondrian. htm (accessed September 20, 2009).*
4. *Nina Felshin, ed., But Is It Art (Seattle: Bay Press, 1995), 9.*
5. *Peter De Bolla, Art Matters (Harvard: Harvard University Press, 2003), 15.*
6. *Marshall McLuhan and Quentin Fiore, The Medium is the Massage (London: Penguin Group, 1967), 123.*
7. *The Times of India's official Web Site, "Tech," http://infotech.indiatimes.com/articleshow/ 3331984.cms (accessed 20 September 20, 2009).*
8. *New York Civil Liberties Union, "Who's Watching?" New York Civil Liberties Union's Web Site, http://www.nyclu.org/pdfs/surveillance_cams_report_121306.pdf (accessed September 22, 2009).*
9. *Scottish Office Central Research Unit, "Crime and Criminal Justice Research Findings No. 30," Scottish Office Central Research Unit's Web Site, http://www.scotcrim.u-net.com/ researchc2.htm (accessed September 22, 2009)*
10. *They Work For You Web Site, http://www.theyworkforyou.com/about, (accessed October 1, 2009).*
11. *Patricia Philips, "Peggy Diggs: Private Acts and Public Art," in But Is it Art , ed. Nina Felshin, 285 (Seattle: Bay Press, 1995).*
12. *George Orwell, 1984 (London: Penguin Books Ltd, 2003), 71.*

MASS BODY INDEX: BIO-OS, A BIOLOGICAL OPERATING SYSTEM

Mike Phillips, Birgitte Aga, Gianni Corino & Simon Lock

Mass Body Index describes an ongoing project being developed by i-DAT called Bio-OS, a Biological Operating System. Bio-OS builds on the i-DAT's 'Operating Systems' (www.op-sy.com) [1] to develop open tools for gathering data from environments (buildings and landscapes) and organisms (crowds and bodies) to dynamically manifest 'data' as experience in order to enhance perspectives on a complex world.

Figure 1. Bio-OS Data Lab, 2011, i-DAT. CC BY-SA.

Figure 2. Human Internal Landscape, Ultrasound Pornography, 1988, Phillips, M., CC BY-SA.
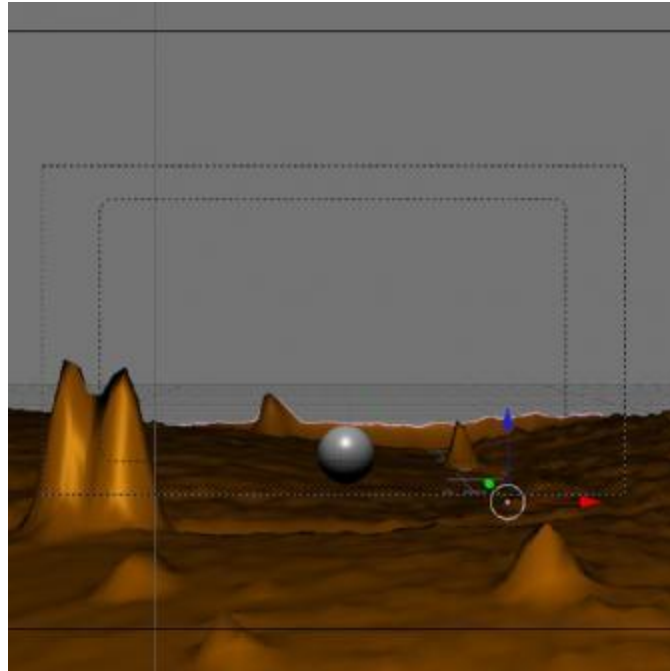
Figure 3. Human Geography, 2011, i-DAT, Atomic Force Microscopy Data in Blender Game Engine. CC BY-SA.

Isotonic Aids Recovery

In many ways, apart from the trauma of general bodily ownership or being owned by a body, 'Bio-OS' [2] was inspired by a longstanding collaboration with the Artist Donald Rodney. As much as it was a continuation of i-DAT's Operating Systems mission, Bio-OS built on the production of collaborative projects such as 'Visceral Canker,' [3] 'Psalms' [4] and 'Autoicon.' [5] Donald's death, in 1998, followed the a long slow degenerative disease of the Darwinian curse Sickle Cell Anaemia which caused his regular incarceration in hospitals and various medical technological apparatus. Donald's work political work was entwined with the attributes of this genetic decease, providing a rich palette of medical paraphernalia that became incorporated into his work, blurring the edges between a personal, racial and political heritage.

'*Visceral Canker*' (1990), now in the Tate collection, was a work that literally incorporated the artist's bloodline. Like many of his works, *Visceral Canker* contained elements of his own body, such as skin and scars. '*Psalms*' (1997), an autonomous wheelchair attempts to articulate the presence or lack of presence of the body. And '*Donald Rodney Autoicon*' (2000), a collaborative project Rodney was working on at the time of his death. The intention was to integrate his 'body' of medical data with an 'expert system' synthesised from interviews, and a rule based montage machine that would allow Autoicon to carry on generating works of art.

From the remnants of Donald's body, whether it was the politics of a bloodline, the space of an empty wheel chair that defined his absence or the attempt of Autoicon to continue the body of creative work, it was clear that the physical body is more than the material of flesh and blood. The body was defined by an absence, an event, a trace, a measurement and it was essentially perfomative and time based. It is this temporal fragmented entity that Bio-OS engages with.

The Mass Body index attempts to define a collaborative body that is neither ill nor super fit, but an aggregation. Whilst Bio-OS positions itself within the field of information visualisation/literacy, the generation and collection of bodily information through the use of instruments overlaps coherently with the history and contemporary fascination of body hacking. However, a preoccupation here is often with the body as object for adornment rather than an engagement with bodily process. Where the body hack converges with the performative it is often in framed within the constraints of choreography. Bio-OS builds on a previous engagement with these frames and constraints.

Previous collaborative projects attempted to capture the body in the form of a Corporeal Archive. The idea of the a corporeal archive emerged as a real time archival process that attempted to capture, articulate and disseminate 'unstable' 'difficult' or 'live' body-based media (particularly forms of dance, theatre, and performance art) through software and conceptual tools. The prototype '*Liquid Reader*' (*Liquid Reader™ v1.1*) [6] explored the reciprocal relationship between 'live' performance and its dissemination through other media, how ephemeral, body-based practices can be captured, analysed, shared and communicated. Here the temporality of the body was the focus of attention. Its spatiality was of importance but its transitions as a flow through time, a trace to be captured and communicated, became the important ingredient in understanding the dynamics, mechanics and physics of the physical body.

A historic fascination with the body, its mutability and its relationship to technology runs deep through the modernist machine aesthetic. The trauma of triage in World War One left more than surgical scars on returning troops. Like perspective and social order the nature of the body had suffered a significant rupture. No longer was the marble edifice of David enough to satisfy, the white exterior had fragmented into a car crash of flesh and bone popped inside out by munitions. The contemporary body freely melts into the technology that surrounds it as distinctions between body and instrument dissolve. The symbiosis evident/required in the cyborg is one of meat and metal, a Léger painting manifest, not one of soul and intelligence or intuition and logic.

As our instruments evolve from an isolated artefact, through physical and social networks into an all-pervading system or process, the nature of our relationship with them will inevitably change. There is now a sophisticated symbiosis between our instruments, and us, what happens to that relationship when the instruments we manufacture become ubiquitous and decentralised from hospitals and medical institutions. Imaging systems and digital instruments have revolutionised our relationship with the inside of our bodies creating a new pornography. This pornography is played out nightly on our TV screens, from House to CSI, or witnessed in the transformative marketing campaigns of soft drink manufactures. What reimagining of the body took place when a drink for sick old people became a drink for the super fit young people?

The Body - not, and, or, if...then, if and only if - ill/well

i-DAT is developing a range of technologies and software under its core program, 'Operating Systems' (op-sy.com). The current Operating Systems are:

- Arch-OS: [architectural operating system] An 'Operating System' for contemporary architecture (Arch-OS, 'software for buildings').
- S-OS: [social operating system] - The S-OS project strand provides an Operating System for social life.
- Eco-OS: [ecological operating system] - Eco-OS collects data from an environment through a mesh network of environmental sensors called ecoids.

- Dome-OS: Dome-OS is based around i-DAT's immersive vision theatre (Full Dome). A transdisciplinary instrument for scientific and artistic production of immersive environments and the manifestation of material, immaterial and imaginary worlds.

The intention of Bio-OS is to make the data generated by human biology tangible and readily available to the public, artists, engineers and scientists. The Operating Systems project explores data as an abstract and invisible material that generates a dynamic mirror image of our biological, ecological and social activities. The Operating Systems project proposes a range of tools and initiatives that have the potential to enhance our ability to perceive and orchestrate this mirror world.

Bio-OS builds on this open technical framework to offer the opportunity to collect and manifest biological data. Dynamic visual and sonic experiences derived from human movement are being tailored to enhance public understanding of the collective, mass biology. In this context Bio-OS and its distribution and engagement mechanisms provide an open tool for public engagement with a domain that is primarily owned by medical, scientific fields.

Bio-OS provides accessible tools (through 'hacks', wearable devices, phone Apps and domestic and public health technologies and social media tools) that are being deployed in daily life for monitoring health and activity. Data collected from these tools feed dynamic databases that facilitate a shared understanding of the mass body index through visualisations and sonifications – a data body culture of health.

The Bio-OS project is supported by the Arts Council England and was delivered through a series of 'Collaborative Data Lab's,' [7] in order to design and share 'instruments' or 'provocative prototypes' topically described as the 'Internet of Things', in this case the human body becomes a networked and shared 'thing'.

Bio-OS generates a rich mix of quantitative and qualitative data. Collectively these processes establish an open participatory 'techno-ethnography' - mechanisms for evaluating engagement and participation. It is the body as a temporal event and the trigger for a whole series of interactions that underpins Bio-OS as a platform. Here the body is seen within the context of numerous external frameworks and social cultural and economic systems. For instance, embracing the preoccupation of the Banking system where processes are based around key stages in the life of a body, birth, marriage, divorce and death (not necessarily in that order). Or the body on a more short-term basis, as the source of sewerage or food consumption around which provoke massive engineering, financial and ecological problems. As such, the body acts as an active node in a dynamic network, linking resources, technologies and social processes.

Human Geography

As a Mass Body Index Bio-OS intends to pervade these human manufactured structures by being part of the material of our shared understanding of our bodies and the collective body. Bernard Stiegler articulates the emergence of this new embedded technological landscape as a "global mnemotechnical system." [8] With such mnemotechnical system in place, information never leaves the world. It just keeps accumulating, simultaneously more explicit, more available, and more persistent than anything we have experienced. In this context Bio-OS strives to contribute to an emergent definition of interaction design strategies for spimes, sentient objects, blogjects or whatever they are going to be called. Bio-OS instruments become more then just biological probes, they emerge as cultural probes, permanently embedded in the body as part of the physical nature of the 'thing' and part of the physical digital ecosystem.

Figure 3. *Human Geography*, 2011, i-DAT, Atomic Force Microscopy Data in Blender Game Engine. CC BY-SA.

The body operates as conduits for exchange for ideas, knowledge and the passing of physical objects. The body is also a node on more problematic network, such as supply chains for food, traffic and amenities. Bio-OS explores the temporality of the body and the latency of the network of bodies and the impact on the environment. Bio-OS engages with the body and the 'things' that cluster around it through a process of participatory design of 'provocative prototypes' that will elicit real time data.

As such it is easy to see how the body becomes institutionalised. How the needs of servicing the organism, feeding, relieving and fixing it become instrumentalised and systematised. A de-humanisation or a re-humanisation? The shift from the body as the focus to the institution that builds up around it is a process of bureaucratic aggregation. Measuring and instrumenting a single body is intimate, a whole hospital of bodies is institutional. Bio-OS is pragmatically engaging with the implantation of instruments into these institutions in order to recover the 'lost' or aggregated body. Most notably through the inclusion in the development team of the E-Health and Health Informatics research group and the deployment of Bio-OS prototypes within the National Health Service Derriford Hospital (Plymouth, UK). For instance, the application of sensors to beds not only provides location (the number of misplaced beds is quite shocking) but also context (urine and temperature sensors can inform on bodily activities and occupation – the number of misplaced patience is even more so).

Without an appreciation of context, interpreting streams of bio signal data is fraught with difficulty. Consider for example attempting to interpret the pulse rate of an individual who is running to catch a bus, without knowledge of what they are doing or why. Human behaviours and external influences interfere with biological signals and can result in misleading data and lead to erroneous inferences. Instrumentation and recognition technologies are not yet sophisticated enough to allow us to accurately distinguishing between different contexts. In order to reliably interpret bio signal data, our focus must shift from considering absolute values to the analysis of relative and somehow correlated values.

Data Body

One such approach to relative values is the use of signal coherence. This concept is easily illustrated with the use of a simple example. During physical exertion, both heart rate (pulse) and breathing rate (respiration) increases. Conversely, during periods of rest both readings will fall. The rates will depend on numerous factors, some of which are accurately measurable, others somewhat less so. As such, these absolute bio signal values tell us little about the health, fitness and general well being of an individual. What is insightful however is the relationship, interdependence and importantly the divergence between these values. This 'coherence' provides a much more sophisticated mechanism for interpretation, inference and understanding. Differences in the rate of change (during both increasing and decreasing phases) provide us with an accurate and reliable appreciation of human physical condition. By considering these relative values we can cancel out and remove much of the noise and interference caused by factors such as external stimulus, exertion and conscious control.

Baselines are another value tool in the interpretation of bio data. We can compare an individual's bio signal patterns with a previously recorded baseline set in order to determine variation and deviation. Similarly, we can perform comparisons of collective community patterns with that of community baselines. By comparing like with like (i.e. a community with itself) we can gain insight into the impact of

short-term events (e.g. illness, bereavement, or other major life events) as well as revealing longer-term trends (caused by aging, diet, environment, exercise regimes etc). More provocatively, we can compare individuals or communities with idealized baselines - allowing comparison and even competition between them and the most fit or healthiest individuals and communities. This provides us with a unique insight into previously unexplored aspects of group and community health.

Bio-OS will engage in the sharing of the Mass Body Index using a similar paradigm to the recent Open Data governmental initiatives (for example in London and Manchester). These attempts by local and regional government to make their activities, achievements and deficiencies open and transparent have had the effect of revealing (anonymised) data regarding the attributes and behaviours of individual citizens and communities. Bio-OS harnesses the technological infrastructure developed for use with Open Data (namely Resource Description Frameworks, Triple Stores, SPARQL etc) yet with a grass roots, "bottom up" and voluntary ethos. Individuals and communities self-exposing there own Bio signal data in this fashion would result in a culture not unlike that which Sousveillance has achieved within the realms of audio visual data - an evolution of body instrumentation and institutions that smother it, and a further exposure of our most intimate parts.

References and Notes:

1. Operating Systems' Web Site, http://www.op-sy.com/ (accessed June 6, 2012).
2. Bio-OS' Web Site, http://www.bio-os.org/ (accessed June 6, 2012).
3. Donald Rodney, "Viscieral Canker," Tate's official Web Site, http://www.tate.org.uk/servlet/ ViewWork?cgroupid=999999961&workid=98078 (accessed June 6, 2012).
4. Donald Rodney, "AUTOICON," Iniva's official Web Site, http://www.iniva.org/autoicon/ (accessed June 6, 2012).
5. Guido Bugmnann, "An Autonomous Wheelchair at an Art Gallery," Plymouth University's Web Site, http://www.tech.plym.ac.uk/soc/staff/guidbugm/wheelchair/wheelc.htm (accessed June 6, 2012).
6. Liquid Reader v1.1, DVD Supplement is jointly developed by i-DAT/ Liquid Press, Performance Research e-Publications and DeMo. Liquid Reader v1.1 produced by the Liquid Press, an i-DAT (Institute of Digital Art & Technology) research project: "On the Page," in Performance Research 9, no.2 (2004).
7. The Bio-OS collaboration includes: Artshare - http://www.artshare.com.pt/ , Message – http://www.message-research.org/ , E-Health and Health Informatics, and School of Biomedical and Biological Sciences. i-DAT Artists commisions: Katy Connor, Simon Evans, Simon Johnson, Hannah Wood. Supported by Arts Council England.
8. Adam Greenfield, Everyware: The Dawning Age of Ubiquitous Computing(Berkeley: New Riders Publishing, 2006), 128.

THE CHOREOGRAPHIC HORIZONS OF ISABEL ROCAMORA: "INCALCULABLE" EXILES

ANNALISA PICCIRILLO

In the workshop "Exile Writing", we explored the question of exile in its multiple technologies. Here, I would like to present a technology of writing that specifically relates to the body: contemporary choreography. The example of the video-dance *Horizon of Exile* (2007) by I. Rocamora will help me to discuss how 'dance', 'exile', 'writing' and 'femininity' intertwine in creating the alternative "horizons" provided by the video digital support.

Writing/Choreography

I would like to introduce, with a lapidary definition, what I mean by 'choreography'. I will quote a statement by the French-Algerian philosopher Jacques Derrida, in his *Writing and Difference* (1978):

And thus we say "writing" for all that gives rise to an inscription in general, whether it is literal or not and even if what it distributes in space is alien to the order of the voice: cinematography, *choreography* of course, but also pictorial, musical, sculptural "writing". … All this to describe not only the system of notation secondarily connected with these activities but the essence and the content of these activities themselves. [1]

Beyond its 'differ*a*nces' – historical traditions, multiple styles and incalculable expressions – 'choreography' can be defined as a system of signs always 'differed' and 'dislocated' in time and space. It is an embodied language that reveals a *technè*, a technology, a shared knowledge of gestures, and a system of memory apt to remember. Its privileged instrument is the body, what writes and expresses its own textuality, with all its "incalculable" differences and all its "incalculable" choreographies.

INCALCULABLE CHOREOGRAPHIES

"Incalculable choreographies": I borrow the expression from the interview conducted by Christie McDonald to Jacques Derrida, where the philosopher is invited to talk on sexual difference, and on the "place" of the feminine in contemporary social-cultural representation. Beyond any binary opposition, beyond the masculine/feminine that governs the decorum of codes, Derrida dreams of – and believes in – the "multiplicity of sexually marked voices … mobile and non-identified sexual marks whose choreography can carry, divide, multiply the body of each 'individual'…". In his conclusion, he remarks:

Then too, I ask you, what kind of a dance would there be, or would there be one at all, if the sexes were not exchanged according to rhythms that vary considerably? In a quite rigorous sense, the *exchange* alone could not suffice either, however, because the desire to escape the combinatory itself, to invent incalculable choreographies, would remain. [2]

Fascinated by Derrida's expression, I will use it as a deconstructionist 'trope', in order to disseminate the meanings of the dancing event; in order to investigate the interaction of multiple bodies in a live dance

performance or in a video-dance work; it will possibly allow me to observe its encounter with the 'other' and its alterity.

FEMININE WRITING

One of my aims is to investigate how 'dance', 'writing' and 'femininity' intertwine; along this focus, it is Hélène Cixous who provides me with theoretical and methodological tools. The French feminist invites us to explore the sources of otherness in the female body, by stating the 'hospitality' of writing as a privileged space for manifesting women's agency and physicality. In *The Newly Born Woman* (1986) and in "Coming to Writing" (1991), Cixous brings the matter of physicality into writing: "When I say "writing" seized me, it wasn't a sentence that had managed to seduce me, there was absolutely nothing written, not a letter, not a line. But in the depths of the flesh, the attack. Pushed. Not penetrated. Invested. Set in motion." [3] Cixous' insistence on the physicality of the writing body seems to imply a direct relationship between the female body and "feminine writing". The work by Isabel Rocamora is an example of such "feminine writing" – where exiled women find hospitality by means of the technology of video-dance. Her choreographic writing hosts exiled voices and bodies; her is the space where women can share, elaborate and, possibly, overcome experiences of displacement and, finally, acquire an identity 'in suspension'.

Isabel Rocamora: *Horizon of Exile*

Isabel Rocamora (1968) was born and brought up in Barcelona by an English father and a Spanish mother. She has been based in the U. K since 1986, and she now is working between London and Barcelona. Graduating in Performance and Cinema Studies from Bristol University, her practice has developed throughout performance, live mixed media and artistic cinema, centered on a rigorous investigation on the performative language of human gesture in its relationship to individual and cultural identity. [4] A technique of aerial movements distinguishes Rocamora's dance – better known as "anti-gravity choreography". The author says: "It uses the hanging body and its 'subversion' of gravity as a metaphor for changing states of consciousness, paralleling the experience of weightlessness with freedom from the rational. Distinct from zero/micro gravity (as experienced in parabolic flights), anti-gravity performance needs the force of gravity to move against." [5] In Rocamora's work, slowness, stillness and anti-gravity forge the movement of the dancing bodies to re-elaborate and negotiate dance's ontological essence: it is movement itself:

 As an anti-gravity artist I have spent the last ten years experimenting to push the boundaries of what the body in suspension is able to do. During these investigations one opens up areas of the body that were previously tightly held. At the point of opening one may feel the release of an experience, a memory, an emotion that had been housed in that area for years. [6]

Horizon of Exile, a 2007 video-dance work, follows the exile journey of two veiled women across timeless deserted landscapes. The testimonies of Kurdish and Iraqi women, living today in London, inform the unfolding of the narrative; alongside are the stories of two older women, themselves exiled, and local to the landscapes of the Atacama desert, in Chile – where the film is actually shot. The chorus of these voices carries, on the one hand, strong memories of the female circumcision, erasure and escape, and on the other hand, it provides the images of a distant childhood home. The female body writing intertwines with the live memories: the live experiences of exiled identities forced to leave their countries

in order to protect a sense of themselves. *Horizon*... talks of a double exile: in one of the video sequences, a spectral female voiceover insists: "Our existence is wrong, being a woman is wrong, it's like that". Some of the voices were recorded in England, as if to reveal a second exile, the one that joins with the 'internal' exile that being a woman signifies.

Rocamora's Voice

Positioning itself between the cinematic, the real world and performativity, Rocamora's work sits between fiction, representation and the metaphor – this creative overlapping mirrors her own personal experience:

These resonant narratives awake a personal desire to treat complex feelings surrounding my own story of exile and self-finding at the age of eighteen (Spain – U.K). While reflecting female Middle Eastern experience of exile and drawing an understanding from my own autobiographical material, *Horizon* is foremost an installation about woman and identity.

Faced with issues of first person representation (Middle Eastern woman from a Western perspective) and wishing to present an essence rather than a given cultural context, I have chosen to construct a fictive character and environment which are drawn from various common denominators: Palestine (lead performer), Central Iraq/ Kurdistan/ Iran (interviewees), Jordan (nomadic desert culture), trans-national Bedouin/ Iran/ Jordan (costumes), Saudi Arabia (call to prayer) and Armenia (music). [7]

In occasion of an informal conversation, the artist told me of the inner drive that pushes her to give voice and movement to exiled/veiled women. She was educated in a private school by nuns; thus, in her childhood, she had a familiar and accustomed understanding of female veiled bodies. After the London bomb terroristic attacks in 2005, an uncanny change took place: Rocamora's perception of the 'veiled body' transformed – no matter what race, religion or ethnic group, she began to perceive those 'veiled' bodies as unfamiliar, as if her gaze was beginning to interiorize the fears and stereotypes intersected to the veil. The veil's issue is complex and impossible to discuss here; still, I find interesting to see how and why Rocamora decides to challenge and re-elaborate the image of veiled bodies'. In her coreography, she offers us her re-vision, her "horizon", of veiled identities.

I will extract three sequences, three "incalculable movements", from Rocamora's work, in order to show the exact places where, in my reading, the essence of exile writing/choreography comes to be realized; the exact loci where the female quest for agency becomes visible.

THE SECRET BEHIND THE VEIL

In the first sequence, the dancer looks into the camera – it is the moment when she meets our 'other' and privileged gaze. In this situation, the confrontation with 'the other', allowing for self-recognition, remains 'suspended' through the use of the veil itself. Slowly, the dancer covers her face – she performs the act of hiding. We cannot see; our western gaze cannot understand what lies behind the veil, incapable of grasping the weight of private sorrows, the pains and the losses carried by the woman's timeless and 'incalculable' journey into exile. There is there a secret: what lies behind the veil is 'incalculable'.

'COUNTER-DANCE'

The second sequence is when two dancing bodies, sitting and falling in a vast scape, betray a 'serene' violence. A flux of primitive energy seems to drive the scene. The choreography is developed through gestures of resistance and subversion. A "counter-dance" is displayed: the women seem to fight with/for their bodies, in order to release a natural instinct, to liberate a prohibited sexual instinct. At this stage, Cixous' call "to write" would resound; her writing becoming the flesh of the two dancer's bodies in subversion:

Write your self. Your body must be heard. Only then will the immense resources of the unconscious spring forth…. To write. it will give her back her goods, her pleasures, her organs, …; it will tear her away from the structure in which she has always occupied the place reserved for the guilty (guilty of every-thing, guilty at every turn: for having desires, for not having any; for being frigid, for being "too hot"; for not being both at once; for having children and for not having any; for nursing and for not nursing. [8]

BODIES/IDENTITIES 'IN SUSPENSION'

The third chorographical movement is visible at different stages of the work as if to reveal the signs of Rocamora's writing. Exile writing is embodied in the 'anti-gravity choreography' manifested in the rolling bodies of the protagonists. The anti-gravity body moves through space, travelling as if it encountered no resistance: "as if the matter of the body itself was no different from the air that is moving in, as if it were rising and descending at one and the same time." [9] In the apparently 'silent' space of the desert, Cixous's writing would resonate once again, seeming to choreograph, comment and be carried along by the dancers' movements:

She doesn't "speak", she throw her trembling body into the air, she let's herself go, she flies, she goes completely into her voice, she vitally defends the "logic" of her discourse with her body; her flesh speaks true…she conveys meaning with her body. [10]

In *Women of Algiers in their Apartment* – original title: *Femmes d'Alger dans leur appartement* (Paris: Des Femmes, 1980) – the Algerian writer Assia Djebar asks us not to forget that "even those bodies who have been incarcerated, no matter what their age, class, or race, may have imprisoned bodies, but have souls that move more freely than even before." [11] In the ending of *Horizon,* the veiled body is near the bank of a river or the shore of a sea; here, the woman encounters water, slowly starting to "unveil" her-self. It is the water to choreograph her body; liquidity becomes the matter, the matrix, and the material of her subversive writing – the space of her survival and of her expression. The act of self-affirmation in water depicts her agency, the movement of her choice – "freely than even before", as Djebar would say. In the kinetic dynamism of anti-gravity, and in the poetical suspension of the body, her female iden-tity is able to find a new place, a new home, a new "horizon", and a new hospitality…

I would like to conclude my comment to this singular example of "exile writing" with the concept of "hospitality". Rocamora chooses multiple places in order to choreograph exile: as a language and as a technique, dance itself makes its journey towards other technologies and other languages; it is choreog-raphy itself to 'exile' towards the video technology.

An act of hospitality can only be poetic

(J. Derrida)

The hosting of dance on the screen provokes specific reflexions. Video-dance differs from a typical live performance because of the multiple features interacting on the digital support. In the first instance, the dancing body is perceived as hyper-visible in being re-presented and re-visible in the time and space "a-venir"/"still to come". With its gestures, the body seems to acquire a 'spectral' dimension – since its performative act experiences the temporal disjunction in a given moment that does not belong to time any longer; it actually returns when we "recall" it in a specific time and space. It is how digitality challenges the so – called 'ephemeral' value of live dance performances – the dancing gesture does not disappear once it is done, but it 'lives on' differently inside the 'spectral' dimension of the digital screen. [12]

Here the discussion could be very productive if we think of digital dance; if, for instance, we might consider here the "motion capture" technology so widely used in contemporary dance. Still, this would take us along a complex path; what we can rather say is that, on the other side of technology, still as its own contersignature, the histories of female displacement find a fruitful hospitality in natural spaces. In *Horizon*… two women leave the urban space, a 'still' space, the space of law and convention where the masculine power penetrates all intimacy from the minaret; they move to the Atacama desert, which, in its landscapes made of ice, vapour and sand, materializes the projection of the two women's interior spaces. The desert and, in the end, water signify an undefined place, possibly arid and vacuous, possibly devoid of points of reference; nevertheless, it is open enough to be crafted by the act of theatre, fertile enough to host the act of female agency. Water is the last horizon; in its impossible frame because too fluid, the dancer restages the wonderful *Ophelia* by John Everett Millais (1852); like the Shakespearean figure, the woman-dancer, 'suspended' there, can affirm her freedom. In this work, nature really hosts female writing – the desert and water absorb the bodies, the traces, the memories – the "incalculable choreographies" of their exile.

"INCALCULABLE" EXILES

There is still one last consideration to make: the journey of Rocamora's exiled bodies reminds us of the dance of contemporary 'real' exiles, which might be part of the 'choreography' of the not-yet-elaborated trauma experienced nowadays by the European collective memory – specifically, by the Italian memory. The Southern coast in Sicily are witnessing the infinite migrating flows of people, carried by innumerable boats, who arrive from Northern Africa to Italy through the Mediterranean Sea. In these 'incalculable' transits, the image of the female body is often absent, even more 'suspended', because of her in/visibility. In this time of 'historical myopia', we should start interrogating the 'veil' covering our own western gazes (predicated on their certainty and belief in absolute knowledge): it might be the necessary way to have an insight into our historical and political contemporary 'choreography'.

Hospitality is culture itself and not simply one ethic amongst others. Insofar as it has to do with the ethos, that is, the residence, one's at-home, the familiar place of dwelling, as much as the manner of being there, the manner in which we relate to ourselves and to others, to others as our own or as foreigners, ethics is hospitality; ethics is entirely coextensive with the experience of hospitality, whichever way one expands or limits that. [13]

References and Notes:

1. *J. Derrida, Writing and Difference (Chicago: University of Chicago Press, 1978), 9.*
2. *J. Derrida and Christie McDonald, "Choreographies," in Diacritics 12, no. 2 (1982): 154.*
3. *H. Cixous, "Coming to Writing" and Other Essays, ed. Deborah Jensen (Cambridge-London: Harvard University Press, 1991), 9.*
4. *Isabel Rocamora's Web Site, www.isabelrocamora.org (accessed June 6, 2012).*
5. *Ibid.*
6. *Ibid.*
7. *Ibid.*
8. *H. Cixous, "The Laugh of Medusa," in Signs: A Journal of Women in Culture and Society 1, no. 4 (1975): 8.*
9. *Isabel Rocamora's Web Site, www.isabelrocamora.org (accessed June 6, 2012).*
10. *H. Cixous and C. Clément, The Newly Born Woman (Minnesota, MN: University of Minnesota Press, 1986), 92.*
11. *A. Djebar, Women of Algiers in Their Apartment, trans. Marjolijn de Jager (Charlottesville, VA: University Press of Virginia, 1992).*
12. *J. Derrida and B. Stiegler, Echographies of Television (Cambridge: Polity Press, 2002).*
13. *J. Derrida, On Cosmopolitanism and Forgiveness (London: Routledge, 2001), 16-17.*

THE ESTONIAN EXPERIENCE: NON-INSTITUTIONAL MEDIA ART PRODUCTION IN ESTONIA

Piibe Piirma

Speaking about media art in Estonia at the present moment, I will bring out 4 main lines (DIY phenomenon, financial situation, blending of various forms of culture, artist's ironic attitude and manipulation with media), which characterize current media art in Estonia and show us, that Estonia has adopted developments underway elsewhere and thus media art is also moving strongly forwards.

Artists have always been curious and open to implementing new opportunities. The rapid development of new technologies has given us fantastic possibilities for expressing ourselves in a modern way, and one cannot underestimate the role of media art in our society. By indeed belonging to the group of "Eastern-Bloc Countries" in geographic terms, we can boldly say that Estonia has adopted quite quickly developments underway elsewhere and thus media art is also moving strongly forwards. This has certainly been helped along by an open society and constant expansion of opportunities. This has certainly been helped along by an open society and constant expansion of opportunities – Western countries' artists' interest in what happens in Estonia and efficiently functioning international contacts.

About the past and present of Estonian media art in brief

Speaking about media art in Estonia at the present moment, I can boldly claim that the media art being created is, for the most part, indeed non-institutional and quite self-generating. We nevertheless also have our own historical heritage, the roots of which stretch back into the 1960's (for example experiments in pop- and kinetic art etc). However, a new wave of media art arose in the mid-1990's, when Estonia accepted the Internet as a new tool of creation and when barriers between Estonia and the rest of the world disappeared. During this period appeared the pioneers of 'net art', who actively and freely began asking questions about computer gender (Mare Tralla, e-mail questionnaire and first web pages), the possibilities of social networking (Raivo Kelomees, "Cybertower") and hypertextual poetry on the Internet (Nelli Rohtvee). The majority of media art in the 1990's was created at the initiative of the students and faculty of the Estonian Academy of Arts. The reasons why artists interested in media art at the time carried out activities at the university are simple - a computer class equipped with Internet capability was created at the Estonian Academy of Arts. The E-Media Center was established in 1994 by the initiative of artist Ando Keskküla. In 1995, artists Ando Keskküla, Sirje Helme and Eric Kluitenberg carried out our first international conference "Interstanding – Understanding Interactivity".

In the present age, where Internet and computers are available to everyone, media art is arising in small groups that do not depend as much on a university or official creative organizations - interest-based groups indeed are formed on many occasions by former new-media university students; however fertile activities still take place by artists' own initiative.

What characterizes non-institutional media art in Estonia?

While speaking of non-institutional media art production in Estonia, I rely upon my personal experience organizing the annual media art festival 'Plektrum' in Tallinn. The festival was conceived just as are many good ideas in the world: in a small suburban attic apartment, where young people decided during a gathering of friends to create a festival of club parties. The small party has grown to this year's already ninth-annual, ten-day-long festival comprising music, exhibitions, audio-visual experiments as well as organized initiatives in public city spaces. The fact that makes it fresh and youth-oriented is that festival organization is controlled by young volunteers, students are allowed to speak at exhibitions and a great number of greater- and less-known figures are able to come before the public with their projects. It is foremost a meeting place for professionals and amateurs that certainly does not solve the large problems of media theory, but which showcases significant trends.

Art events and workshops that have taken place at the festival over the years superbly exemplify the DIY phenomenon that I regard the first characteristic feature of Estonian media art - art projects and workshops transpire with low-tech resources, using a hands-on method. The availability and simplicity of technology, which enables us to function almost without boundaries, is the most important aspect in the activities of contemporary artists. It is not a question of a lack of topics or the complexity of tools, but rather the limitation of capabilities and time to ourselves.

The second important aspect of characterizing Estonian media art is problems financing it. Naturally, we possess support structures that also support good projects when necessary; however they do not number many and I believe the constant search for new, alternative opportunities has by and large even benefited art. This leads in turn to looking for cooperative possibilities with foreign partners and the desire to also acquaint one's activities outside of Estonia's national borders.

The third attribute that characterizes our contemporary media art is the dissolution of various forms of culture. Software programming and innovative technological solutions have mixed actual creative works with coordinated events, actual communication holds an important place alongside that done on the Internet and everything seems to be permitted. Therefore it is often very difficult to determine, from what point one is dealing with software art and from what point it is performance or some other phenomenon. This is, of course, not a unique experience for Estonia alone - the blending of mediums is happening everywhere. Yet the fact that cooperation in the field of culture is functioning wonderfully between Estonians from creative backgrounds and those from other walks of life demonstrates greatly that Estonian artists are closely following developments elsewhere and are capable of locating their activities within a wider context.

The fourth phenomenon that I can certainly regard as characteristic for Estonia is a certain joyfully ironic attitude towards widespread problems. Work performed with media artists and exhibition curation has shown that fears and taboos become a part of humorous commentary rather than heavy philosophical discussion. An interesting paradox surfaced while putting together the exhibition "Transparent Generation" in 2008 - the issue, which elsewhere in the world has become popular, did not incite works with fear or negative undertones in the least; our artists regarded the topic rather with happy superiority. Through the works, we found that surrounding cameras and carefully-checked personal data is an unavoidable part of contemporary society with which one must come to terms, and which must be utilized in the very best way in art. It is worth noting that a review of the exhibition in a major Estonian daily newspaper was given the headline: "What the knowledge that Britney Spears is pregnant gives us". Following this, the article, which was published in the online press, received an immense number of views and proved in a lively fashion that manipulation with media is one part of our culture.

In summary

The current age shows clearly that Estonian media art is generated through very practical activities re-gardless of the existence of a definite institution. Several artists using new media as a tool today origi-nate from very different fields of life and thus provide media art with ever newer interdisciplinary di-mensions. At the same time, the annual festival undoubtedly helps to boost the reputation of media art, to allow people to grasp the coexistence of art and technology as a whole, to work and brainstorm ac-tively in this field. And the most important aspect it helps to foster is the meeting of interest groups.

Estonia has certainly done a great amount of work in the IT sector, however cultural figures must be suc-cessful, taking into account their few opportunities. As a small and quite poor country, we are in a situa-tion in which the act of making art and especially "underground" manifestations must successfully make do on their own. On the other hand, such a situation directs one towards greater creativity that is not dependent on material values - towards establishing exciting cooperative groups, high-volume and con-stant self-learning as well as searching for international contacts.

Nevertheless, I find that the current age provides us with fantastic opportunities because we live in an environment where a high number of both technologies and cooperative networks are at our disposal, several diverse kinds of events take place and all ideas may be realistically feasible in the context of media art.

References and Notes:

- *Raivo Kelomees "The State of Estonian Media Art AD 1998", - Estonian Art nr 1, 1998, article is available in Art Orbit Internet publication, http://www.artnode.se/artorbit/issue3/f_estonian/f_estonian.html*
- *Plektrum Festival 2011 official Web Site, http://plektrumfestival.com/en/*
- *Timo Toots's Web Site, http://works.timo.ee/*
- *An example of sustainable media art project (Taavet Jansen, Maike Lond), http://www.mimproject.org/*
- *Artists group 'You must relax', http://www.youmustrelax.com/?lang=en*
- *Kärt Ojavee's interactive textile, http://www.symbiosiso.com/family/symbiosisw/*
- *The exhibition 'gateways. Art and Networked Culture' (Kumu Art Museum, 2011) http://www.goethe.de/ins/ee/prj/gtw/enindex.htm*

THE RHETORICAL ART OF DATA VISUALISATION

JEREMY PILCHER

Art that visualises data is commonly understood to enable a transparent understanding of a large amount of factual information. I argue that art which employs such a technique may also be understood to critique the value-systems and hierarchies of importance that give rise to the networks and data flows that are visualized. Art may open an engagement with what society has to occlude in order to maintain its existence without change.

Data visualisation techniques have been used by artists as a means to critique society, and in particular capitalism. Such art is often understood in terms of the reduction of an overwhelming amount of data to a meaningful representation. The availability of data, and its visualisation, is attributed with improving greater transparency and accountability of the systems that structure our lives. It is commonly regarded as desirable that the way in which data is presented should be transparent. [1] Data visualisations are understood as evidence of, and as an explanation for, the world. So called 'new media art' is regarded as a particularly effective site for such visualisations because of the opportunities it provides to interact with the underlying data.

It is arguable that a transparent representation of affairs as they exist is, in itself, not a critique of how things ought to be. The work of Arthur Danto provides an approach to art that responds to this issue. He argues that art that employs factual data does more than represent the world; it expresses a point of view about the content of the work. However, Danto's argument is weakened by maintaining a distinction between the form and content of art. Instead, starting from Derek Attridge's understanding of the work as a performative event, I will explore how art may provide the opportunity to acknowledge that which must be ignored by any given society if it is to remain unchanged. My argument is that, approached in these terms, interaction with data may uncover the contingencies in the way societies are constructed.

They Rule

My argument will be progressed by engaging with *They Rule,* [2] which is an activist work of art by Josh On that has won a number of awards, including the Dutch Electronic Art Festival in 2003. It provides the viewer with the opportunity to interact with data about some major institutions and the boards of directors of the top 500 companies in the United States of America. The work exists in two versions, which respectively incorporate static data collated in 2001 and in 2004. This is clearly acknowledged on the site, which states that "*They Rule* is NOT a Live database of board members and companies. That information changes constantly. I hope to update the database annually, and try to ensure that the links are accurate at the time of launch." [3]

Each of the companies included in *They Rule* is represented by an icon of a company board table, which appears on screen surrounded by avatars representing the directors on the board. The size of an avatar reflects the number of company boards on which a director sits. As icons and avatars are clicked, the work allows connections between companies to be traced by the construction of network diagrams. It is

possible to discover, for example, that "the members of the boards for the so-called competitors Coke and Pepsi actually sit together on the board of a third corporation, Bristol Myers Squibb." [4]

The Representation of Data and *They Rule*

Christiane Paul describes how the work may be understood to employ technology against companies using the Web as a marketing tool, which "turns us into transparent customers." [5] The subversive effect of the work is commonly understood in terms of a greater understanding of the world as it exists. It has been observed, "If only the economic realities it depicts were as transparent and intuitive as its navigational structure, this would be a more benevolent world. The ease and transparency of the design layout, combined with an intriguing subject make *They Rule* an exquisitely idiosyncratic icon of activist web-design. Visit it today before They Outlaw It." [6]

Yahya M Madra explicitly contextualizes Josh On's work in terms of a critique of capitalism: "In *They Rule*, the moment of appropriation, in its exploitative capitalist form, is represented as a system of networks. While 'they' do have proper names, what is represented here is not particular individuals, but rather 'they' as a collective of appropriators." [7] However, directors qua directors are company employees. As such, it may be questioned whether networks of directors should be regarded as an underlying class of appropriators. In terms of global capitalism, my view is that the term "appropriators" is better reserved for the shareholders and their interconnecting portfolios of company shares. Such shareholders will include not only individuals, who may also happen to be directors, but also other companies.

The important aspect of Madra's description is the attention it draws to the work as a systemic critique. The work focuses attention on a feature of the legal system of the United States of America. *They Rule* does not reveal that companies will always have boards of directors that are interlinked. It enables people to realise that companies may, but won't necessarily, be connected in this way. *They Rule* illustrates that there are some directors (of companies recognised by the law as separate legal personalities) who sit on more than one board and, in the process, connect competitor companies. However, as an exploration of the work reveals, there is no guarantee that links between companies will be found. Indeed, it is entirely possible that even when networks of boards of directors are identified from *They Rule*, neither these nor even the companies, will still currently exist.

The content of the database employed by the work is fixed at given points in time. Accordingly, many of the connections it is possible to identify by using *They Rule* are out of date and may even have been so at the time it first appeared online. The implied premise of continuing to understand *They Rule* as having an impact is that, irrespective of whether the individual networks depicted remain in existence, the work enables users to visualise specific networks that illustrate an ongoing feature of the economy, which is permitted by company law. My argument is that the critical force of the factual representations of data in *They Rule* lies in the exploration of the underlying legal system through iterations made possible by the work's interface.

The Art of *They Rule*

They Rule, through depicting factual information, has been understood to reveal that there is something wrong with capitalism, or perhaps more specifically with the legal system of the United States of America. The existence of any specific network of directors may be unknown. However, the generic existence

of interconnections between boards and even the widespread extent of such links is not a revelation. This feature of the legal system of the United States of America has previously been identified and understood without the interactive creation of network diagrams. It is not immediately apparent that *They Rule's* features, such as the manipulability and interactivity of the work's data, make it significantly different from other diagrammatic representations of historic data about a given state of affairs. Understood as art and approached through the work of the philosopher and art critique Arthur Danto, *They Rule* might be regarded as the expression of a value judgement. This would involve arguing that the work goes beyond representing the world as it is and visualises the point of view that it is wrong for a legal system to allow the formation of networks of interconnecting companies.

In 'The Transfiguration of the Commonplace' Arthur Danto engages with what distinguishes representations, such as diagrams, from works of art that may be visually indiscernible from such images. He argues that an artwork must be about something, which is to say that art expresses something about its content. In art there is a "double role of representation and expression" that must be engaged with when interpreting the work. [8] Artworks not only depict content, they also "project a certain point-of-view about whatever they are about. Whereas mere representations aspire to transparency, artworks express ideas and attitudes toward whatever they represent." [9] Approached in terms of Danto's argument, art that employs diagrams manages to do this, at least in part, because of the connotations diagrams have in our culture due to their use in disciplines such as economics and engineering. Understood in terms of the diagrams constructed in *They Rule*, the work simply represents the links between companies. However, as an artwork *They Rule* expresses condemnation of the interconnectedness of companies and their directors.

Danto's argument is an intriguing one but it raises a number of questions to which satisfactory responses are not provided in 'The Transfiguration of the Commonplace'. It is not clear to me that an account of *They Rule* in these terms provides a means to understand how, or indeed why, it is regarded as expressing a value judgement about the fact that company boards interconnect through directors. In addition it is possible to argue that the attitude expressed toward the content of the work does not itself escape from being part of the content. It is what might be described as meta-content or content about content. Danto briefly acknowledges this issue and reflects on the possibility that, when any representation is in some way self-referential, it will be an artwork. The task of examining content for the point of view expressed in it may recede away without end. Danto identifies this as a significant problem and suggests only that "the question in this form has not, to my knowledge been raised before in the entire history of the philosophy of art" [10]. My argument is that these issues may be engaged with through the work of Derek Attridge, which he explicitly acknowledges is much indebted to that of Jacques Derrida.

A Legal System Less Violent

In the 'The Singularity of Literature' Attridge argues that art works should not be understood instrumentally as communicating meaning, but rather as events that give rise to new meanings and feelings. Despite the title of the book, and the fact that much of his argument deals specifically with literature, Attridge makes it clear that he considers his work is applicable to art in general. He proposes that works should not be understood in terms of an opposition drawn between form and content or meaning. Instead, Attridge understands art as "bringing into existence a configuration of cultural materials that, at least to a certain group and for a certain time, holds out the possibility of a repeated encounter with alterity." [11] Viewers respond, not to "an attribute or a substance, but to an event: more clumsily we

could speak of the performing of narrativity, metaphorizing, imitating, describing." [12] The focus is moved away from a concern with the extraction of a work's meaning toward an engagement with it in performative terms. Art stages an opening with that which an existing cultural order has to disavow in order to be able to continue without change.

Approached in terms of Attridge's argument the critical force of *They Rule* may be understood in terms of the way in which it opens an awareness of the violence of the law. More specifically, this manifests in the way that the legal system of the United States of America allows companies to interconnect through their directors. My argument in this respect starts from the way that the work invites the focus of attention to be widened out from the factual accuracy of the data visualised to include the process of how that data is explored. The fixed nature of *They Rule's* database, the concomitant datedness of the data, and the way in which the identification of the extent and nature of connections between directors is contextualised by the links that cannot be traced, all make the work weak when understood as a set of factual representations of networks.

The effect of the characteristics of *They Rule* is that it may be understood to hold the data as a fixed given, which directs attention towards the way in which meaning is constructed by means of the selection and manipulation of data to create visualised networks. The screen quickly becomes cluttered with data after expanding a few companies' boards. Directors with no contacts between the companies selected to be searched need to be deleted from the screen. In the process of locating networks of interconnecting boards of directors users are, in effect, compelled to be selective about the data that remains in sight. In the event that users want the remaining data to appear in the form of a visually appealing diagram then the icons and avatars that remain, together with the lines that connect them, have to be moved around the screen until the desired pattern for the network is achieved.

There are many fascinating diagrams saved on *They Rule* but it should not be forgotten that not all investigations using its database result in establishing the existence of network connections. I propose that the critical force of *They Rule* arises out of the process that users work through to identify and construct the visualisations of connections between (competing) companies (that have been) permitted by the legal system of the United States of America. The work invites users to focus on the interface to, and the interaction that it provides with, its database. It opens the opportunity to reflect on the multiple visual iterations of data derived from a legal system. *They Rule* directs the attention of those users who repeatedly explore the work's databases toward the legal system that underlies all of the visualised data. In the process it stages the chance of judging whether it is just for the networks that are identified to (have been allowed to) exist.

The work may be understood to open an engagement with justice because *They Rule* stages an aporia in which every legal system is entangled. All laws are necessarily applied at times that are different from those at which they were formulated and brought into being. This means that any given law will need to be applied in specific individual situations, not all of which can be anticipated. As Derrida points out "Each case is other, each decision is different and requires an absolutely unique interpretation, which no existing, coded rule, can or ought to guarantee absolutely." [13] The problem is that, in addition to being applied in specific situations, laws are also required to be general enough to allow them to be enforced equally and in a way that is not arbitrary. [14] Legal systems will always need to make efforts to recognise the specific circumstances of each case so as to enable there to be justice despite the generality of the law. However, ultimately it is impossible for decisions to be made as to the legal merits of every case on an individual basis whilst at the same time maintaining the universality of the law.

The more established and general laws are the more apparent become the difficulties associated with trying to reconcile the general with the particular. In broad terms, the laws that enable companies to be brought into existence and provide the framework within which they are operated are well established and accepted in the United States of America and other countries around the world. The inevitable violence of the law is in the way it asserts the authority to determine what is generally acceptable and to demarcate when exception(s) will be permitted in the name of justice. *They Rule* enables the visualisation of iterations of combinations of companies and in doing so opens an opportunity to evaluate this violence. This is because it provides the opportunity to consider the (im)possibility of a legal system that is general enough to apply equally and at all times to all directors, whilst at the same time being able to respond to specific circumstances that may mean that connections between companies are entirely legitimate and justifiable. *They Rule* invites reflection about whether the law could be less violent and in the process become more just. The force of *They Rule* is in the way that it directs critical attention, from outside the legal system, to the application of the law and the inevitable violence of the contingent boundaries it establishes.

Conclusion

I have sought to argue, through an interpretation of the work *They Rule*, for an approach to art that employs data visualisation that goes beyond understanding such work as a transparent depiction of content about the existing world. My aim has been to engage with *They Rule* both in terms of its factual content and by identifying the significance of the interface that has been provided to its content. The work enables the creation of visual iterations of networks made possible by the laws of the United States of America. This process invites users to become aware of the (im)possibility of a legal system that can be sufficiently general to be both fair and equal for all and at the same time able to make exceptions in specific cases. Attention is drawn to the violence of the legal system of the United States of America in the way it claims the authority to create and enforce the regulations that govern the way in which such an aporia is to be resolved. As such, *They Rule* stages an opening with that which an existing system has to disavow in order to be able to continue without change. While the law must necessarily be violent, when the possibility is raised that the law could be articulated differently and "grounded on less arbitrary modes of authority", there is always scope for a more just legal system. [15] The political impact of *They Rule's* visualisations is to unsettle claims to transcendence by the law, and in so doing open it to transformation by those it presently excludes.

References and Notes:

1. *E. Tufte, Envisioning Information (Cheshire, CT: Graphics Press, 1990), 33.*
2. *J. On, "They Rule," http://www.theyrule.net (accessed July 25, 2011).*
3. *Ibid.*
4. *J. Ippolito, "Ten Myths of Internet Art," in Leonardo 35, no. 5 (2002): 496.*
5. *C. Paul, Digital Art (London, Thames & Hudson, 2003), 205.*
6. *D. Johnstone, "Webwork 4: 'They Rule'," Magazine Électronique du CIAC 21, 2005, http:// magazine.ciac.ca/archives/no_21/en/oeuvre4.htm (accessed July 25, 2011).*
7. *Y. M. Madra, "Encircling the Real," in Rethinking Marxism 15, no. 3 (2003): 321.*
8. *A. C. Danto, The Transfiguration of the Commonplace (Cambridge, MA: Harvard University Press, 1981), 148.*
9. *N. Carroll, "Essence, Expression and History: Arthur Danto's Philosophy of Art," in Danto and His Critics, ed. M. Rollins, 86 (Cambridge, MA: Blackwell, 1993).*
10. *A. C. Danto, The Transfiguration of the Commonplace (Cambridge, MA: Harvard University Press, 1981), 149.*
11. *D. Attridge, The Singularity of Literature (London: Routledge, 2004), 28.*
12. *Ibid., 96.*
13. *J. Derrida, "Force of Law: The Mystical Foundation of Authority," in Cardozo Law Review 11, no. 5-6 (1990): 961.*
14. *W. W. Sokoloff, "Between Justice and Legality: Derrida on Decision," in Political Research Quarterly 58, no. 2 (2005): 342.*
15. *Ibid., 345.*

DIGITAL AND INTERACTIVE CHOREOGRAPHY: INNOVATIVE WOMEN IN THE DANCE HISTORY

LUDMILA PIMENTEL

We are interested to describe, analyze and propose to dance a new concept: the concept of Interactive Digital Choreography. So our focus is in the digital choreographic possibilities with interactive quality, and contributions and new ideas proposed by women who participated in the recent history of Interactive Dance.

Fig. 1. Bluebody, 2008, by Ludmila Pimentel and Mariana Carranza, interactive installation, Copyright Ludmila Pimentel.

Fig. 2. RGBodies, 2008, by Ludmila Pimentel and Mariana Carranza, interactive installation, Copyright Ludmila Pimentel.

The Interactive Digital Choreography explored in this work shares some features with Interactive Art. We consider that the concept of Interactive Art comes from a continuation of the artistic movement advent of interactive installations that arise with the first facilities of videos installations that team together with *happenings* and conceptual art; all of them are part of the artistic movement of the 60s.

To understand the Interactivity of contemporary events we need to understand the events that happened in the history of art since the beginning of 20th century with Futurism, and continued with Fluxus, Process Art, Kinetic Art, Conceptual Art, until the contemporary stage of Art and Technology. We need to understand the collaboration of the work of John Cage, Robert Rauschenberg, Nam June Paik, also the new concepts proposed by Cybernetics, and of course the progressive 'dematerialization of the art object', which involves the active and physical public 'participation' in the event.

So, considering this context we need to mention the contributions of Allegra Fuller Snyder [1] that in 1965 proposed three distinct categories of dance and film. One would be the simple recording of a dance, where with just one camera, and also just a unique point of view, the dance danced on stage was recorded, another is the documentary film category of dance, where the narrative is respected but dance is adapted to film by using the camera close-ups, made distinct, and other technical capabilities, and more cameras available, and finally the cinedance, or 'choreocinema' (a term proposed by John Martin), [2] that is the creation of a new art, which can transcend the biological potential of our gravitational body and where it was introduced, according to Snyder, new possibilities of the body. Last category is the one most closely related to the topic of this work and in the emerging Interactive Digital Choreography alternative ways of moving bodies, new body shapes.

Comparing with interactive installations and digital art works, sound sculptures, immersive experiments, computer games and more recently Internet based forms of tele-presence, the Interactive Dance, in a more restricted survey of designated assisted art computers, can not vindicate to itself as long and heterogeneous history.

According to Gretchen Schiller, [3] since the beginning of the theatrical art, the artists have been expanding the concept of body through the materials and technologies, as a precedent for Interactive Art based on the movement. Sure there are many examples of dance choreography in which technologies were used, not just digital, transcending biological limitations of the body, such as the introduction of pointed shoes, in 1832, in the ballet *La Sylphide*. But, Loie Fuller was the first artist to stage the real technological breakthrough in the late nineteenth century when she began to make use of the lights not just to make the scene visible but also to create an atmosphere. She also used artifacts to extend and multiply her body image, or even transform it into animated shapes, and by doing so she brought into the world a new and revolutionary concept of dance.

After Fuller, the first experiments in the area of dance and technology are the films by Maya Deren (1940), and even before, studies on the chrono movement photography and cinema made by Muybridge, Marey and Mèliés, all of which may be considered in the historic route of digital animations systems called 'motion capture'. In addition, choreographers, researchers and teachers have used video, since this technology has been available, as an important tool to analyze documents or existing works.

In order to recognize the importance of women in Dance History and Technology we should not forget Thecla Schiphorst, [4] a graphic designer and dancer. She led a group of graphical researchers at the University of Simon Fraser (Canada), in the beginning of 1980. Schiphorst actually invented 'Lifeforms', a software that allows the creation of the choreography in a virtual platform where one can also watch

the choreography. It makes possible to the artist to see the movement from several points of view, a condition not available for real stage. Therefore, it was a woman who developed the software 'Lifeforms' but her name is not connected to the software she created. Instead, it became wordly famous through the name of a man, the north-american choreographer Merce Cunningham, who first worked with the 'Lifeforms'.

We cannot forget to register the contemporary choreographer Dawn Stoppiello, [5] one of the creator's of the software Isadora with Mark Coniglio of Troika Ranch Dance Theater, as another important modern matriarch in the history of dance and technology, specially her contribution to the development of a choreographic interactive language in dance performances. Stoppiello highlights the importance of interactive systems to meet these available to the largest number of artists interested in an increasingly simple and accessible to anyone with some training and familiarity with the computer.

We believe that in this new architecture for interactive dance, we have a new philosophical condition that enables us to be harmonic within the spatial context that we live, in wich we are immersed, and it is inseparable of our bodies. In short, a performative relational architecture that invites participation, and does not exclude the virtual architectures, besides it, includes the body in the experiment. We can not forget to mention the brazilian artist Lygia Clark that in the middle of 20th century and together with the Neo-concrete movement participants invited the body of the visitors to come inside of the objects and art installations, as a pre-historic stage of the Interactive art. For us is fundamental reveal this kind of no-mentioned history, the women contributions in the history of art and technology, in the history of dance and technology…

The dance creators have widely performed dance work in multimedia scenarios, sophisticated structured for consumption and aesthetic contemplation of the audience. Dance installations and online interactive dance, which invite user's participation are rare events. They form a new field of studies open to analysis and aesthetic evaluation of this new interface.

Each of these experiences and creations developed by choreographers with their software, offer different notions of what is the conception of dance, movement, body and the proposal of interactivity or even ideas of what is an interactive choreographic system.

The dance is seen in Brazil even as something to embellished and sculpt the female body, and not as a form of expressionist art, rebellious, much less as a way of developing the feminine discourse of her own body and authority, with few exceptions of recent contemporary dance productions. It is part of our school of Dance (UFBA) role to expand the notion of female corporeality building a more libertarian way, including tools for these bodies to be more independent, supplying ways to construct creative and technological autonomy in order to make a significant change in the former model and greatly strengthened in the countries of South America where most people think that technology is not a field of research for women.

How to change a trajectory of these female bodies used to attend the wishes of the choreographers who are mostly men? How to change the fate of little girls whose bodies are being forced into being more feminine and docile since childhood? How dance can change this reality and not just be another tool of body domestication?

This paper is rather an attempt to write the history of dance in interface with new technologies, highlighting those contributions often hidden in official discourse, which is the history of dance written by male.

There is still much to write, to fight, to do ... I write this paper for us all women…

References and Notes:

1. Allegra Fuller Snyder,"Three Kinds of Dance Film: A Welcome Clarification," Dance Magazine 39 (1965): 34-39.
2. John Martin proposed the term 'choreocinema' to analyze and illustrate Maya Deren film productions, in his writing as dance critic of New York Times newspaper in 1946.
3. Gretchen Schiller, "From the Kinesphere to the Kinesfield: Three Choreographic Interactive Artworks," in Leonardo Journal 41, no. 5 (2008): 431-437.
4. See also Thecla Schiphorst, "Body Noise, Subtexts of Computers and Dance," in Computer Graphics 31, no. 1 (1997): 14-15.
5. Troika Ranch´s official Web Site, http://www.troikaranch.org/about.html (accessed July 10, 2010).

THE FOOD SIDE OF SOUND AESTHETICS

LEANDRO PISANO

This paper describes some art examples related to sound/food topic starting from a scientific perspective and investigating the field bounded by performance art, sound art and research. Through comparing molecular gastronomy to digital music and analyzing the connection among sound and food as a way to re-design a rural territory, this paper outlines how the knowledge of food and sound can add important information in the 'tasting' process.

Our evaluation of food is related to a variety of contextual information perceived through the senses: the pleasure we get from eating is obviously influenced by the taste and the smell of food itself. Also, visual presentation and colour are important, as well as the feel of the food in the mouth, with its temperature and texture. The senses of taste and smell are so tightly combined in the evaluation of flavour that it is sometimes considered a form of synesthesia which is common to us all. Recently, researchers have been focused their attention to various cases of synesthesia. They are also analyzing if the perceptual experiences of syntesthetes are so very different from those of non-synesthetes.

Our senses undoubtedly are not isolated from each other. Indeed, living in a multi-sensory world, our brain constantly works combining data from different sensory modalities in order to make sense of our environment. Through reporting a number of cross-modal associations such as pitch and visual size, colours and tastes or brightness and the frequency of vibrotactile stimuli, some researchers have shown that these associations "are different from those present in syntesthetes in that they are bidirectional, and a stimulus presented in one sensory modality does not elicit a conscious experience in another modality. However, the existence of these cross-modal associations supports the hypothesis that synesthesia might originate in feedback connections from a point of convergence of the two sensory pathways." [1]

According to the latest research on the matter conducted by Sagiv & Ward (2006); Ward, Huckstep, & Tsakanikos (2006), cross-modal associations and synesthesia can be usefully compared in order to better understand both phenomena. Also, it has been shown that there are implicit associations between tastes and particular pitches: in particular, on the one hand sweet and sour tastes are associated with high-pitched notes, on the other hand umami and bitter tastes are preferentially matched to low-pitched notes.

As Charles Spence of Oxford University has stated, the perception of the crispness and staleness of potato chips can be affected by modifying the sounds produced during the biting action. Participants of the experiment were asked to bite into 180 crisps that had different freshness. The sound produced by the bite of each crisp was processed through electronic devices (microphone, computer, headphones) and edited in real time to evaluate the participants reaction. The results showed that crisps were rated 15% fresher and crisper if the crisp sound was played louder, or if just the high frequency components of the biting sound (above 2 KHz) were boosted.

Another experiment conducted by Spence was investigating the role of auditory cues in the perception of carbonation in beverages. The results showed that it's possible to modify the carbonation of a fizzy drink by changing its sound. As Lorimer Moseley writes, "In the future, we may be able to reduce the

amount of 'tooth-rotting' carbonic acid in fizzy drinks simply by changing the sound that the drink makes in the can. Prof Spence's research may also suggest novel interventions to bring back the enjoyment of food for the growing elderly population who have started to loose their sense of taste and smell since there is currently nothing we can do to bring bask those senses once they have started to decline." [2]

Recently, an aesthetics experience called "Foodfrequency" and based on synesthetic and cross-modal research of Charles Spence, was presented by the chef Giulia Massimiliani, the dj Michael Byrne and the sound designers Marco Galardi and Sara Lenzi. During the "Foodfrequency" experience, participants were required to immerse themselves into the taste of Italian foodscape while listening via headphones to binaural immersive sounds of the origin of the ingredients alternating a multichannel soundscape without headphones. Through the sound experience, a connection was created with the tastes and flavours: the stories of the ingredient were narrated employing specific frequencies able to increase the food experience.

Charles Spence has also collaborated with Heston Blumenthal, English chef and owner of The Fat Duck, a world renowned restaurant in Bray, Berkshire, which researches the molecular compounds of dishes aiming at enabling a greater understanding of taste and flavour. Together, Spence and Blumenthal have experimented that it's possible to flip the flavour of bacon and egg ice cream by changing the background sound. The ice cream tastes more 'bacony' if who is tasting can hear the sound of bacon sizzling in a pan, while it tastes far more 'eggy' if some farmyard chickens acoustic samples are played as a background sound instead. Even seafood taste nicer when eaten while listening to the sounds of the seaside: The Fat Duck tasting menu has as one of the signature dishes a course named "The sound of the sea", a plate of seafood presented to diners together with a seaside soundtrack played through an iPod put into a seashell on the table.

Blumenthal is well known for being one of the chefs that in the past decade have inspired his work to methodology, philosophy and experimental approach belonging to the Molecular Gastronomy movement, in terms of experimenting the advances in biochemistry and soft-matter physics to analyse and comprehend culinary processes in an innovative way.

Although the term "molecular cuisine" cannot indicate a specific style of cooking, "as the chef labelled as 'molecular' have very different styles and the role of science in cooking is usually limited to the development of a new technique or a new recipe and there is very little 'science' in the final preparation of a dish," [3] it's interesting to notice that in the poster for the first "International Workshop on Molecular and Physical Gastronomy", held in Erice, Italy in 1992, specified that this meeting aimed to explore four points: "to what extent is the science underlying these [cooking] processes understood; whether the existing cooking methods could be improved by a better understanding of their scientific bases; whether new methods or ingredients could improve the quality of the end-products or lead to innovations; whether processes developed for food processing and large scale catering could be adapted to domestic or restaurant kitchens." [4] Two things need to be emphasised in this brief excerpt: on the one hand, the interactions between science and cooking, which at the beginning of the past decade led to the first collaborations between chefs and scientists: in France, chef Pierre Gagnaire teamed up with Hervé This; Heston Blumenthal with Peter Barham in England; in Spain, Andoni Luis Aduriz and later Dani Garcia with Raimundo Garcia del Moral, and Ferran Adrià with Pere Castells; on the other hand, an innovative research oriented to deconstruction (or reconstruction) of cooking in terms of the 'simple' chemistry and physics of the food.

In a way, these approaches can be compared with sonic technique of Granular Synthesis, in which sound samples are used often as grain contents. Through distributing grains in time and selecting parameters from the synthesis of each grain, the sonic quality of a granular texture can be obtained. Usually, the duration of grains is short and they are often distributed densely in time, so that the resultant sound can be perceived as a blend texture. "Granular Synthesis or Granulation is a flexible method for creating animated sonic textures. Sounds produced by granular synthesis have an organic quality sometimes reminiscent of sounds heard in nature: the sound of a babbling brook, or leaves rustling in a tree. Forms of granular processing involving sampled sound may be used to create time stretching, time freezing, time smearing, pitch shifting and pitch smearing effects. Perceptual continua for granular sounds include gritty/smooth and dense/sparse. The metaphor of sonic clouds has been used to describe sounds generated using Granular Synthesis. By varying synthesis parameters over time, gestures evocative of accumulation/dispersal, and condensation/evaporation may be created." [5] Granular Synthesis technique is the result of long-standing ideas about the nature of sound. In the second half of the last century, quantum physics have demonstrated that sound can be atomically reduced to physical particles. As Isac Beeckman has later explained, sound travels through the air as globule of sonic data.

Starting from 1950s until the last decade of XX century, some theorists or composers including Dennis Gabor, Iannis Xenakis, Curtis Roads and Barry Truax have contributed to evolve the particle theory of sound into a synthesis method whereby the natural sound particle is reproduced, being layered with other imitation particles, and the particle itself can be cloned or extracted through being processed with a similar method as the original, in order to create different sounds.

Definitely, Molecular Gastronomy and Granular Synthesis are featured by a common approach, not only through deconstructing and reconstructing molecular structures in order to act on the chemistry and physics of food/sound, but also creating through texturization process (in molecular cuisine with gelling agents, emulsifiers and thickeners; in granular synthesis with granular synthesisers/granulators) an evocative narration between micro and macro, liquid and solid, accumulation and dispersal, condensation and evaporation.

In the last years, linking sound and food is becoming an interesting research topic not only in the psychology of perception but also in new media art studies. The latest research is focusing not only, as we have seen before, on the key factors of hearing related to multi-sensory perception of food, but also on some vernacular expressions that are rising from a performance-oriented aesthetics research, analyzed through a multidisciplinary perspective.

Every recipe, as a list of operations to be executed in a time interval, could be considered as a contemporary full score that is at the same time well-defined and unpredictable in its sonic development. The sound and the taste of food can allow us to journey around the world by putting us in touch with different cultural traditions, localizing us in a precise context and by mixing cultural elements it can allow us to cover distances. If Heston Blumenthal once said that food is especially evocative in conjuring memories, we could extend the meaning of his words by saying: food and sound.

Among the most significant projects operating in the field bounded by performance art, sound art and aesthetics research, we can find The Vegetable Orchestra, a musical ensemble founded in Vienna in 1998 based on the concept of using fresh vegetables as source material for the creation of instruments (which are built for every rehearsal and concert from scratch), all sounds and all music. Dealing with expanding the borders of the notion of what is understood as music and by working with vegetables, the Vegetable Orchestra musicians also rethink the concept of sound as a permanent transformation from

food into an instrument and back to food again. During their performance, the instruments already fall apart. They change their consistence and loose water and shape. The sound elicited by the vegetables turns into smell and later into taste when the musicians enjoy with the audience their instruments at the end of the concert in form of soup.

One of the founding members of The Vegetable Orchestra, Ulrich Troyer, was invited for a residency project together with the cook Philipp Furtenbach and the musician Kassian Troyer during the 2006 edition of Interferenze new arts festival - a new media art event immersed in the forest of Mt. Partenio in the rural region of Irpinia, South of Italy. During the three days of the festival (the theme was "Naturalis Electronica"), the artists have condensated culinarically and sonically local food and sounds, through recording on location the soundscape of the site and combining acoustically this material with the sounds that emerged during the process of the preparation and condensation of the food. The process of the condensation has evolved slowly over the period of three days and in certain time slots during the festival it was possible for the audience to listen to and to degustate the condensation of the tastes and the sounds collected. A way to let the naturalistic and gastronomic identity of the place play together and to link together technology and tradition. What emerged from the project was not so much the result, but the process during which people were made aware of some ancient and very slow processes: visitors could come, taste and listen to the sound of the performance that was presented as a social sculpture, something focused on the value of the time, the importance of slowness, the sense of the place. [6]

This project was part of the Interferenze festival section called "Click'n'Food", which offers a panoramic of performances based on the relation among food, music and new media arts. Food represents one of the main theme of the festival, through a strong involvement of the typical food and wine of Irpinia, a tradition of high quality standards presented in an international context. The aim is to propose a path that, through projects based on evidence, creative intelligence and sensory experience, is designed to promote/foster a virtuous cycle where the quality of production and the consumption of food is inextricably bonded to sustainability, environmental quality and social relations. Through choosing "Rurality 2.0" as the theme for the 2010 edition of Interferenze festival, the curatorial board decided to offer a different perspective on rurality starting from the territory itself. Moreover, the location of the event, the Ducal Castle of the little village of Bisaccia, has become for some days a laboratory where a rural territory and its characteristics (identity, traditions, natural environment, landscapes, gourmet) lead to a more open expression where languages of aesthetics of new media become new forms of sharing. In this perspective, food was analyzed both from an economic and a cultural point of view. In the first taking into consideration detailed tracking of the supply chains, whereas on the latter it considers it as a trigger for sustainable local development and tourism, and as an important part of the 'Slow Life' philosophy.

This year, the Click'n'Food section was based on three residency projects that started some days before the festival: the first one, entitled "Noble Milk" has involved the sound designer Yasuhiro Morinaga and the video artist Antonello Carbone, that were asked to make a sound and visual reinterpretation of a field trip at high altitude on the Podolian pastures which the two artists had on the mountains of Irpinia in the days before the three days event. Podolian cattle originates directly from a big structure and long horny cow, called "Bos Primigenius", who is supposed to have been domesticated in the Middle East during the IV millennium BC and later coming from Ukraine to Italy during the barbarian invasions. Being a cattle who always walk along, Podolian needs big extension pastures: this requires to shepherds to practice the transhumance, that takes place in the Apennines mountains along the so-called 'tratturi', the wide grassy, stony or hard soil paths that have been originated from the passage or trampling of

herds. Nowadays, only 50.000 head of Podolian survive in Italy, due to its less adaptability to intensive stock-breeding. Although the milk produced by Podolian cattle is really not much and it is obtained only during limited periods in the year, but the quality is extraordinary: Podolian lives exclusively on pasture and never goes in the stall, also eating grass in areas of high mountains that are very clean and not contaminated and thus they can produce milk of high value both from a nutritional standpoint and as well from the point of view of transformation. Caciocavallo Podolico is a type of cheese made out of Podolian cattles' milk and is one of the finest food products of South of Italy, with its smell of milk, butter, fresh grass, smoked hay, stall, wet straw and with its taste sweet and sharp together in the most mature shapes. Yasuhiro Morinaga and Antonello Carbone performance at Interferenze festival took place in conjunction with a tasting of "Noble Milk", produced by cows fed by only forage and pasture withough GMOs or silage.

The second Click'n'Food project was "Viand", asking Tana Sprague to analyze processes of production of Irpinia artisan cheese (mainly Caciocavallo). Reading through the filter media of aesthetic craftsmanship, sound, images of a secular tradition were merged together. "Viand" was presented at Interferenze 2010 in the form of a live performance articulated on the concept of multiple simultaneous perception. While the cheese maker Giovanni Di Roma was working to produce a Caciocavallo shape, Tana Sprague played background sound captured during her visit in the historical center of Calitri village at the Di Cecca & Di Roma's Caciocavallo cheese cave ("Grotte dei Formaggi"), which is a tuff cave where Caciocavallo shapes are aged. In such an ancient place, where formerly farmers lived together with pack animals, different devices have been recently installed in order to monitor the microclimate according different parameters (temperature, dampness, oxygen, carbon dioxide, ammonia, breeze speed) that let us know about maturing process.

In the last project "Foodjob: frequencies to dissolve under the tongue", the sound designer Enrico Ascoli and the local cook Pompeo Limongiello introduced the festival audience to the delicious tasting of sounds extrapolated and mixed live from the sizzle of codfish, a typical plate that has an important tradition in Irpinia, because it's one among the few types of fish which can be preserved for a quite long time. The performance was divided on different synaesthetic levels (taste, smell, tough, sight, hearing) based on a real time recording with panoramic and piezoelectric microphones of resonances captured during food preparation.

Finally, the artists involved in the Click'n'Food project are asked to live together for few days, in order to experience the preparation of a foreign experience that underline social and aesthetic aspect of it. They will eventually re-interpret processes acquired during this experience either in live and studios performances. The idea behind the Click'n'Food is to transform the elements that characterise the rural and peripheral region of Irpinia - where ancient roots of food culture are tightly intertwined with the territory and its local culture - in a fascinating mixture of imaginative narrative of tradition and pure aesthetic fun.

As Alessandro Ludovico writes, "How many other festival crews are able to organise such events overstimulating your senses, with free local fresh and delicious food (the caciocavalli cooking and tasting live session was a hit) coupled with new audio/visual interpretations? The intertwining of local specific culture and natural roots with the infinite narrative possibilities of electronic has been once again been exploited in this beautiful and peripheral land." [7]

References and Notes:

1. Anne-Sylvie Crisinel and Charles Spence, "As Bitter as a Trombone: Synesthetic Correspondences in Nonsynesthetes Between Tastes/ Flavors and Musical Notes," in Attention, Perception, & Psychophysics 72, no. 7 (2010): 1994.
2. Body in Mind: Research Into the Role of the Brain in Chronic Pain, "Sound Bites - Foods that Sound Better Taste Better," Bodyinmind.org, August, 2009, http://bodyinmind.com.au/sound-bites-foods-that-sound-better-taste-better/ (accessed June 30, 2011).
3. Davide Cassi, "Science and Cooking: The Era of Molecular Cuisine," in EMBO Reports 12 (2011): 192.
4. Ibid., 191.
5. Ross Bencina, "Implementing Real-Time Granular Synthesis," in Audio Anecdotes III: Tools, Tips, and Techniques for Digital Audio, ed. Ken Greenebaum and Ronen Barzel, 15 (Natick, MA: A. K. Peters, 2006).
6. Ulrich Troyer, e-mail message to author, 2010.
7. Alessandro Ludovico, "Mediaterrae 2007 Report", Neural's official Web Site Online, May 30, 2007, http://www.neural.it/art/2007/05/mediaterrae_2007_report.phtm (accessed June 30, 2011).

VISUALIZING NEW MEDIA ART IN CENTRAL EASTERN EUROPE

Agnieszka Pokrywka

Numerous amounts of facts connected with new media art in the territory of Central Eastern Europe go unused because of the inability to see relationships between different kinds of information. To face this issue the idea of CEEMAC2000+ has emerged. This paper briefly discusses the basic terms needed to understand the new media art situation in the region as well as presenting the possibilities for CEEMAC2000+ development.
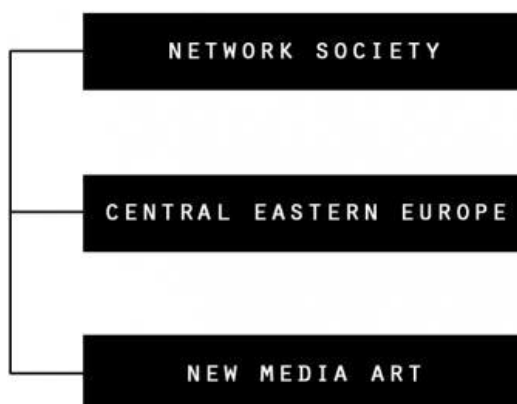
Fig. 1. Possible connections between three main terms described in section 2. Image by Agnieszka Pokrywka.
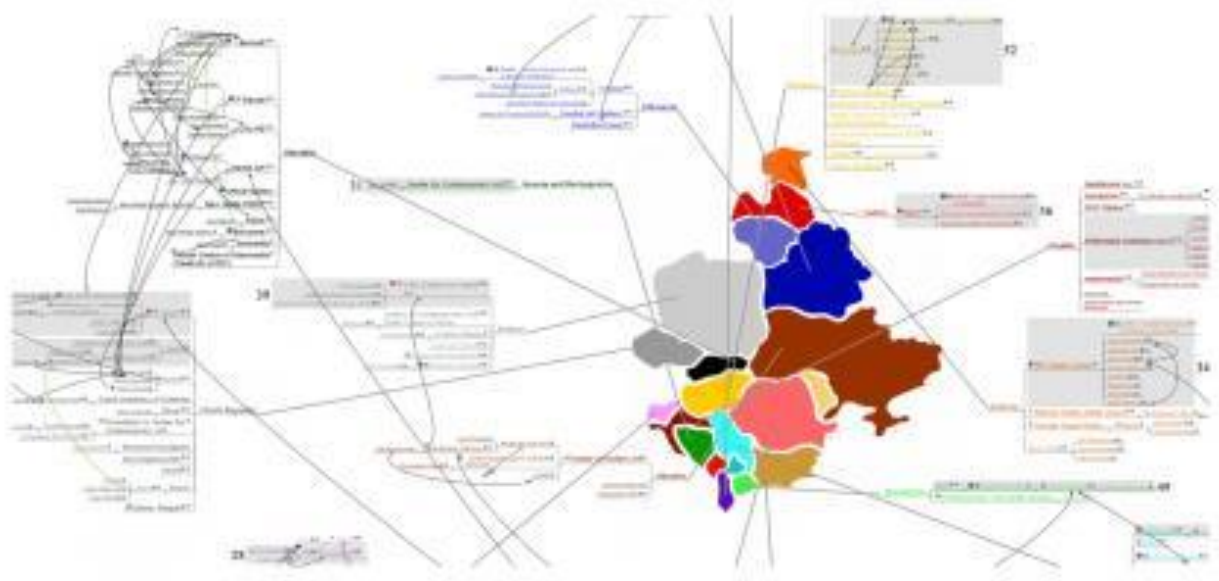
Fig. 2. Sketch of CEEMAC2000+. Image by Agnieszka Pokrywka.

1. Introduction

Central Eastern Europe (CEE) has for a long time been hidden behind the Iron Curtain in many aspects and is still an undiscovered hybrid built out of the past and present. Similarly, local new media art (NMA) is a tangle of historical and political dependencies mixed with current global influences (e.g. networked society, high technologies). In addition, the very dynamic specificity of this region blurs a wider view of CEE and NMA activities. As a result, considerable amounts of data and facts connected with this topic are unused simply because people cannot see any relation between them or visualize their quantities. The concept of CEEMAC2000+: Central East European Media Art Chart (2000-now) is intended to be a collaborative interactive map which could be able to present most of the networks, dependencies, connections between art centers, projects, and people which focus on local NMA development. CEEMAC2000+ aims to collect, share, and present large amounts of data in a non-linear, clear and visually attractive way, simply to create new artistic cartography.

The paper is structured in the following way. Section 2 briefly presents emerging terms such as CEE, network society, and NMA. Section 3 gives examples of how these terms can be merged. Section 4 focuses on data visualization and its use in the context of CEEMAC2000+.

2. New Europe, new society, new media

The first step of the CEEMAC2000+ project development is to explore stereotypical terms like CEE and NMA with a special focus on the history of CEE (Soviet times) and its current situation (network society, technological development).

2.1. CENTRAL EASTERN EUROPE

Norman Davies [4] states that borders between Western and Eastern Europe were changing a lot. However, the territory on which these bounds were moving did not belong to any of the aforementioned parts. Because of this, terms such as CEE have appeared. According to Piotr Piotrowski [10] Central Eastern Europe is a territory which from the late '40s up until 1989 was dominated by the Union of Soviet Socialist Republics (USRR). Nowadays, countries of this region (Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Montenegro, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova , Poland, Romania, Serbia, Slovakia, Slovenia, and Ukraine) are located between the so-called Western countries (Germany, Austria, Italy) and Russia.

2.2. NETWORK SOCIETY

According to Manuel Castells, [3] a network is a decentralized matrix of nodes through which communication can occur with a multidirectional freedom and which is not restricted by time or space. A common feature of all networks is the synchronization of each part and the simultaneous independence of every single node. These nodes have different levels of development and infrastructure which depends on the political and economic situation of the region in which they are located. The level of nodes development determines the whole network. Networks establish the new social order of current societies. This is caused by passing from the industrial age into the information age, and from energy to information. Castells sees the information technology revolution as one of the processes which leads to the production of new social morphology within a society.

2.3. NEW MEDIA ART

Marshall McLuchan [7] understands the medium as the message itself, which can create a new environment simply through its presence. To describe this idea he uses the metaphor of a light bulb which does not have any content but which certainly has a social effect and enables people to extend their daytime activities into the nighttime. Art creativity, which is based on media, can be explained as an art form which makes use of facilities such as electronic equipment, computing, and new communication technologies. As Louise Poissant [10] states, technology and its various processes are often used in experimental ways to produce different works of art. Additionally, Lev Manovich [8] explains that today's new media interpretation can be understood as the mix between older and newer cultural conventions for data representation, access, and manipulation. Here, the old data means a representation of visual reality and human experience, and often an understanding of culture. The new data is understood as numerical data.

3. New Europe + New Society + New Media

There is strong dependence and fusion between three terms mentioned in section 2. The most prominent of these terms are discussed below.

3.1. NETWORK SOCIETY IN CEE

Development of network society, where the key social structures and activities are organized around electronically processed information networks, is deeply connected with technological advancement which is lower in CEE (according to Digital Opportunity Index in Europe, 2006). Moreover, Manuel Castells [3] claims that it is not just technology which defines modern societies, but also cultural, economic, and political factors which make up the network society. Therefore, it is necessary to reflect on the network society in the context of its nodes' location which are in mutual relation.

3.2. NMA IN CEE

Net art, as one of the branches of NMA, has been strongly influenced by a context of cultural crisis in CEE at the beginning of the '90s. After experiencing separation and underground movements for some time, CEE net artists were able to notice that the Internet "a space where you can buy is a space where you can steal, but also where you can distribute." [5] Another example of dependency of new media artists on their location is the fact that tools which are needed for NMA creativity are mostly results of technological development, which is on a much higher level in so-called Western countries. It can mean that the specificity (or even existence) of NMA differs according to location, although recently these differences have seemed to become smaller.

3.3. NMA AND NETWORK SOCIETY

Upgrowth of network society is influenced by technological advancement. This means that underdeveloped regions with limited access to new technologies are simultaneously on margins of networked society. As Manuel Castells states: "If you are not in this space of electronic communication, you do not

exist, in our society" [1]. Moreover, reduced access to technology both limits creative possibilities of new media artists and makes it more difficult to promote their works on a larger scale.

4. Data Visualization

The second step of CEEMAC2000+ project development is to thoroughly research data visualization. This can help to improve classification and understanding of large quantities of different data connected with NMA on the specific territory.

4.1. CEEMAC2000+ CONCEPT

CEEMAC2000+, networked graphs visualization, aims to record the relations between artists, curators, projects, events, and organizations which shape NMA in CEE. Time based dynamic topology of creative collaborations as well as patterns of contributors are planned to be freely-accessible and regularly up-datable by the community of users. An interactive interface for navigating and exploring the network of artistic collaborations is embedded in the CEEMAC2000+ dataset and can bring benefits for both NMA creators (possibility of more aware collaboration) and its researchers (access to knowledge about particular nodes and their position within the larger network). CEEMAC2000+ wants to deliver new interfaces for flexible interaction with collected datasets and productive collaboration across borders.

4.2. CEEMAC2000+ REALIZATION

The main purpose of data visualization is to communicate information clearly and effectively by graphical means. Ideas can be communicated effectively thanks to a balance between aesthetics and intuitive functionality. Moreover, understanding leads to interacting which can help with the development of new media based art on this territory. According to Ben Fry [6] there are seven stages of data visualizing which can be found useful during CEEMAC2000+ implementation.

- Acquiring: obtaining the data.
- Parsing: providing some structure for the meaning of the data, and arranging the data into categories. Basic categories and subcategories are planned to be structured in the following way: people (artists, curators), events (projects, single events, cyclical events), organizations (media labs, centers, museums, galleries).
- Filtering: removing all but the data of interest. Network graphs can become confusing if there is a substantial growth in the amount of data. Because of this, CEEMAC2000+ omits events which took place before year 2000. Obviously only territory of CEE is in the scope of CEEMAC2000+ interest.
- Mining: applying methods from statistics or data mining as a way to discern patterns or placing the data in a mathematical context.
- Representing: choosing proper visual modes.
- Refining: improving the basic representation to make it clearer and more visually engaging.
- Interacting: adding methods to manipulate the data or to control what features are visible.

5. Summary

NMA in CEE is dynamic and changeable. This is why CEEMAC2000+ can be helpful in understanding the specificity and tendencies in the field. NMA creators, thanks to CEEMAC2000+, gain unique opportunities to have an overview of the movement of which they are a part. In the case of NMA researchers CEEMAC2000+ delivers new ways of documenting artistic activities, story-telling, and knowledge formation.

References and Notes:

1. *C. Barney, "Q & A with Manual Castells," Network Society, http://tinyurl.com/5rrqazq (accessed September 10, 2011).*
2. *J. Bollen, L. Milford, C. Wallis and J. Fewster "Aus-e-Stage Navigating Networks: Visualizing Artistic Networks in the Performing Arts" (paper presented at ALIA Information Online Conference & Exhibition, Sydney, 2011).*
3. *M. Castells, The Rise of the Network Society (Oxford: Blackwell Publishers, 1996), 594.*
4. *N. Davies, Europe: A History (Oxford: Oxford University Press, 1996), 1365.*
5. *A. Dekker, "Interview Heath Bunting," SKOR's Web Site, http://tinyurl.com/5waqxzg (accessed September 10, 2011).*
6. *B. Fry, Visualizing Data: Exploring and Explaining Data with the Processing Environment (Cambridge, MA: O'Reilly Media, 2007), 366.*
7. *M. McLuchan, Understanding Media: The Extensions of Man (London: Routledge, 2001), 400.*
8. *L. Manovich, "New Media from Borges to HTML," in The New Media Reader, eds. N. Wardrip-Fruin and N. Montfort, 13-16 (Cambridge, MA: The MIT Press, 2002).*
9. *P. Piotrowski, In the Shadow of Yalta: Art and the Avant-garde in Eastern Europe, 1945-1989 (London: Reaktion Books, 2009).*
10. *L. Poissant, "New Media Dictionary Terms - Part I," in Leonardo 33, No. 2 (2000): 137-140.*

DIGITAL ART AND CULTURE AFTER INDUSTRY? – TOWARDS AESTHETIC BUSINESS STUDIES

Søren Pold & Christian Ulrik Andersen

The article discusses art's potential to critically probe new media economies and sometimes even develop new economies. With references to theoretical concepts from early marxist art theory it focuses on digital art, where the production, distribution, showing and selling has become part of the artistic work. The main example is *Electroboutique*(Chernyshev, Shulgin et al.), a series of works that address the current value of critical art.

Fig. 1. The exterior of the Electroboutique by Chernyshev & Shulgin, Trondheim, Norway, 2009.

Fig. 2. Commercial Protest (from Electroboutique by Chernyshev & Shulgin): A viewer sees her own portrait as a mosaic made out of transnational company logos.

Fig. 3. wowPod (from Electroboutique by Chernyshev & Shulgin): a huge distorted but still functioning iPod.

Digital Art and Culture After Industry? – Towards Aesthetic Business Studies

Who dominates in this country without morals, without faith, without any feeling; and from where do all feelings, all beliefs and all manners come, and where do they end? Gold and pleasure. Take these two words as guiding lights and travel through this great plaster cage, this beehive of black streams, and follow the serpents of this thought that agitates and lifts the work. You see. Examine first the world that has nothing. (Honoré de Balzac, *La Comédie humaine, Scènes de la vie parisienne*)

We live in a so-called 'new economy' and this is nothing new. New economies have emerged, boomed and crashed several times. Art and culture have played prominent roles in such new economies, from the 1880's panoramania to the various new media crazes during the last 30 years. Art often serves as the backdrop to champagne soirées and helps the nouveau riche establish themselves and gain some cultural capital during economic boom periods. In many instances this leads to a rather traditional, mainstream and sometimes even pre-modern view on aesthetics, far from the ruptures of contemporary art and aesthetics. A central example would be the concept of experience economy that Joseph Pine II and James H. Gilmore launched in the late 1990s. [1] If one looks at Pine and Gilmore's concept of aesthetics it borders on the escapist and is characterized by immersion and passive participation. Their principal guidelines are "Theme the experience", "Harmonize impressions with positive cues" and "Eliminate negative cues", and their primary examples are Disneyland, Las Vegas and the Hard Rock Café. [2]

However, art's most valuable contribution is perhaps not the icing on the cake or the aesthetic harmonizing of contradictions, but exactly the opposite: the ruptures, disruptions, clashes and breakdowns – all the ways that contemporary art explores things, situations and constellations that break apart, contain paradoxes or contradictions in relation to business. In many ways this seems to be the drive when "avant-garde becomes software," [3] net-art becomes web design or software art invades the app store. Instead of arguing that art might be a means to serve economic ends, we should ask whether the economy could potentially become artistic in some way.

Actually, we see traces of this already happening. When a cultural content industry, such as the music industry, is in crisis and its business model is deteriorating because of dwindling CD sales, competition from easy web-based distribution and copying, then both new and major acts bypass the industry by carrying out the marketing and distribution themselves, using the web and social networks. Instead of an industry of major record labels handling the relationship between artists and audiences, this becomes part of the artistic work defying industrial standards and forming less standardized and industrialized relations between artists and audiences. In fact, the business model, including how to finance, market, distribute and profit from the content, becomes part of the artwork and it becomes part of the artistic statement to question common models. This is of course helped by lowering production costs, easy networked distribution, new relations between artist/author and audience/consumers mediated by more flexible, dynamic or situational artworks. These new relations between artists and audiences are also indicated by diverse but related concepts such as "relational aesthetics," [4] the "craft consumer," [5] Free Software production and Free Culture including a culture of modification and remix. [6]

AESTHETIC BUSINESS STUDIES

Consequently, it becomes evident that art's relation to the market and economy is part of the artistic development and innovation, but this also means that art becomes 'about' the economy in a more direct way. How should we interpret this, how do we learn from it, and how do we develop aesthetic business studies?

In order to look into this, we first need to introduce a few theoretical concepts from early marxist art theory, because here we can find positions that discuss how art can potentially play a critical, constructive, progressive, if not revolutionary, role. In the 1930s materialist art theoreticians such as Georg Lukács and Walter Benjamin were discussing how the change in the base, or "Unterbau", of reproduction technologies affected the superstructure, or "Überbau", of culture, economy and thinking, and how art could respond to this. A prime example is Georg Lukács' reading of Honoré de Balzac's *Illusions perdues*, which he sees as a novel about how literature becomes part of a capitalistic production process, and he discusses how this becomes a theme in terms of both form and content in the novel. The novel explores relations between developments in printing technology (personified by the printer and inventor David Séchard), book trade and the failure of romantic poetry (personified by the main character, the failed poet Lucien de Rubempré). As such, it is a novel about the commodification of literature and the capitalization of the mind ("Geist"). It is, however, not just a product of this, but rather a media-realistic, disillusioned although clear-sighted, literary exploration demonstrating relations between the base, the superstructure and literary strategies in this changing economy; and it does this through the literary form of the novel (e.g. the portrayal of the main characters, the use of melodrama, etc.). It is an example of a conscious exploration of a new discourse economy, exploring how material changes influence the formal conditions of the artwork. [7] The main character and poet, Lucien de Rubempré, becomes disillusioned, but the novel develops a view on the literary market and contemporary society through its development of an alternative formal, novelistic language.

With his concept of "Tendenz" (tendency) Benjamin also argues for a formal relationship between art and the production process in a way that might help elucidate how art can function as a probe for investigating change. Technological revolutions in media lead to fractures in artworks and art history, making the deep "Tendenz" visible. [8] In this way, the normally hidden, deeply layered fractures, constellations or contradictions become observable if probed by art. Furthermore, while constructing a marxist dialectic view on art history, Benjamin is clearly not interested in 'politically correct' literature and art:

...rather than asking, 'What is the attitude of a work *to* the relations of production of its time?' I would like to ask, 'What is its position *in* them?' This question directly concerns the function the work has within the literary relations of production of its time. It is concerned, in other words, directly with the literary *technique* of works. [9]

In continuation of these arguments by Lukács and Benjamin it is important that art is not created uncritically on the premises of media and economy but that it seeks a conscious, reflective and critical exploration, and this has of course become even more relevant with the rising importance of media. How the production process and market relations are positioned *in* the work is what to look for, rather than the work's attitude to the market and media. Contrary to the view on art and aesthetics promoted by Pine and Gilmore, we should look for art which focuses on the fractures that reveal deeper tendencies (Tendenz) when carrying out aesthetic business studies. Or, in other words, as suggested by the initial quotation from Balzac, follow the money; if not to collect it, then to see which new routes it takes and to observe the creatures and creations it passes by.

ELECTROBOUTIQUE

Let us start our aesthetic business studies and look briefly at some relevant art. Under the concepts "Media Art 2.0" and "Electroboutique" a group of artists, including Aristarkh Chernyshev and Alexei Shulgin, have made a series of artworks – each produced in a "limited number of copies (like Ferrari)" and sold "at affordable prices (like Sony)" – which they show and sell at galleries, festivals, museums and on-line, often installed in a shop-like environment. [10] The intention of the project is to create opportunities for new media art in galleries and museums, which have often neglected it because of technical difficulties and its immaterial character, making it difficult to exhibit and sell. Furthermore, many of the *Electroboutique* works also perform a humorous and poignant criticism of the (art) market and the relation between art and design.

One of these pieces, *Commercial Protest*, which is a flat screen TV equipped with a live camera contained in a shopping cart, showing the captured images – e.g. images of the viewer – as company logos, is introduced in this way:

It is difficult to protest these days against capitalism, especially if you are a member of capitalist society and enjoy all its benefits. Any convincing form of protest very soon gets appropriated by the system and starts being used for its sake: in politics, in advertisement, in design, etc. But we want to protest! – and offer the new, realistic form: *Commercial Protest*. We protest in the form of a critical but/and commercially suitable artwork. *Commercial Protest* reveals the essence of modern people; – it shows what we are all made of. A viewer sees her own portrait as a mosaics made out of transnational companies logos (variant: consumer goods). These images are globally recognizable and constitute the visual language of today. The supermarket cart that contains the TV set emphasizes the ugliness of the ultimately consumerist world. We protest against such state of things with this piece and set a fair price on it. [11]

It is obvious that this is a criticism of consumerism, which is paradoxically packaged as a nice, fairly-priced art object for galleries and collectors who can see themselves as live logo portraits. The irony is, of course, an integral part of the artwork, where the artist realizes that "criticism in art becomes an aesthetic category and eventually acquires itself the features of a consumer project," [12] and, as such, critical art becomes a brand in the art market. However, it is not only ironic but also a comment on a situa-

tion where software art is not accepted by the large institutions that still need objects, though the experimental and experiential dimensions of software have become an important part of the market, e.g. in smartphone app stores. Much commercial design is driven by innovations in art: however, artists often do not get a share of the revenue, especially in the copy-paste culture of new media. With this in mind, *Electroboutique*openly copies concepts from not only art history, including Russian Constructivism, and media art in the tradition of Nam June Paik or Jenny Holzer, but also from design icons, and relaunches them as new artworks – a good example being the huge distorted but still functioning iPod, *wowPod*, or the various distorted television remakes.

In short, we will point to the following tendencies guided by *Electroboutique*:

- The recuperation of critical art by design and the market, which *Electroboutique* answers by recuperating commercial aesthetics and rhetoric. This is done in a sincere, manifest and, to some extent, successful attempt to sell art and make a living, which is again creating some provocation in the new media art ghetto – e.g. when it was presented at the transmediale festival, Berlin, 2008. Recuperation is not new, neither in art nor design, but *Electroboutique* highlights its way of working by using it artistically and by recuperating design in media art for sale.
- Fractures between the immaterial and the object or between software and hardware in the art market and in the general economy – in this case, handled and highlighted by constructing object-based software art. This both mimics the more traditional contemporary art world alienated by new media art, such as net-art and software art, and alienates parts of the new media art scene; though more former net-artists are following the same route (cf. e.g. the attempt to enter new media art into the contemporary art scene of the Brussels art fair with the exhibition *Holy Fire*). [13] It is hardware-based art building on insights from software art, especially around the visual culture of interfaces, as stated in one of the manifestos: "We live in a world of visual interfaces. Televisions, print advertisements, politics, shop-windows, show-business, internet services, bank systems are primarily interfaces whose task is to shape the process of information transfer and the translation of ideas. Working with visual interfaces, we make them visible and tangible. We uncover the structures of today's world." [14] As such, *Electroboutique* smuggles software art into the art world disguised as artistic objects.

Of course many other examples could be made pointing towards these and more contemporary tendencies, but we hope you get the general idea: art has the potential to simultaneously question and develop the economy. There is a straight line from *wowPod*to iPad, and to the future of sculptured and visually attractive entertainment centres from Apple that will replace our TVs and hi-fis, or from *Commercial Protest* to the narcissistic self-promotion through one's iPhone and the many branded platforms on Web2.0 (just start watching how portraits mix with brands and logos on an average Facebook page…). As Piero Manzoni has already demonstrated with his Merda d'Artista in 1961, which was 30 cans of artist's shit sold at the equivalent price of gold, the artist is the modern day alchemist making artificial gold. However, the smell of it, or its non-existent traditional use value, also casts a critical light on the virtual foundation of our money-based capitalistic economy. The main point is to focus on how art develops an artistic economy, and thereby reflects critically on the current economy while developing alternatives. As Shulgin himself puts it: "Contemporary art has got one more function. It finds out the possible borders of consuming." [15]

References and Notes:

1. *J. Pine and J. H. Gilmore, "Welcome to the Experience Economy," Harvard Business Review 76, no. 4 (1998): 97-105.*
2. *Ibid., 102-103.*
3. *L. Manovich, "Avant-garde as Software," Lev Manovich's Web Site, 1999, www.manovich.net/ DOCS/avantgarde_as_software.doc (accessed June 30, 2011).*
4. *N. Bourriaud, Relational Aesthetics (Dijon: Les Presses du Réel, 2002).*
5. *C. Campbell, "The Craft Consumer: Culture, Craft and Consumption in a Postmodern Society," Journal of Consumer Culture 5, no. 1 (2005): 23-42.*
6. *L. Lessig, Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity (New York: Penguin Press, 2004).*
7. *G. Lukács, Probleme des Realismus III: Der historische Roman, Vol. 6 (Neuwied-Berlin: Luchterhand, 1965), 474-89.*
8. *W. Benjamin, Gesammelte Schriften (Frankfurt am Main: Suhrkamp, 1980), 752.*
9. *Ibid., 686.*
10. *A. Chernyshev and A. Shulgin, "Electroboutique," in Criti/Pop: Electroboutique, Chernyshev, Efimov, Shulgin, ed. Moscow Museum of Modern Art (Moscow: XL Gallery, 2008).*
11. *Ibid., 12.*
12. *A. Obukhova, "Criti/Pop," in Criti/Pop: Electroboutique, Chernyshev, Efimov, Shulgin, ed. Moscow Museum of Modern Art, 128 (Moscow: XL Gallery, 2008).*
13. *Y. Bernard and D. Quaranta, eds., Holy Fire : Art of the Digital Age (Brescia, FPEditions, 2008).*
14. *A. Chernyshev and A. Shulgin, Electroboutique, ed. Moscow Museum of Modern Art (Moscow: XL Gallery, 2008), 3.*
15. *Quoted in A. Obukhova, "Criti/Pop," in Criti/Pop in Criti/Pop (Electroboutique, Chernyshev, Efimov, Shulgin), ed. Moscow Museum of Modern Art, 129 (Moscow: XL Gallery, 2008).*

THE BIG BANG OF ELECTRONIC ART: MERGING ABSTRACTION AND REPRESENTATION IN THE AGE OF DIGITAL IMAGING

ANAT POLLACK

In the society of the spectacle, the art of the mass media changes the Modern relationship between art and its audience. The art resides in the shaping of this unseen, diffuse spectatorship where the medium is the masses. Co-opted imagery in massmedia challenges the meaning of Abstraction & Representation. Artists who appropriate and decontextualize mass media images from consumptive value to the sublime is a form of utopian remediation.

"objet petit" #2 & #3. Diptych by Anat Pollack 2010

In the society of the spectacle, the art of the mass media changes the Modern relationship between art and its audience. The art resides in the shaping of this unseen, diffuse spectatorship where the medium is the masses. In mass media, context transmutes image from scopic to semiotic. The onslaught of media-images sublimates the image to the message, and renders it meaningless. In my work, I transmute semiotic to scopic.

In the "objet petit a" series, digitally modified images taken from television commercials shift the meaning of classical notions of Abstraction and Representation: the definitions of which are fungible within this context. Ads sell an abstraction: desire, fear, and or an idea, but not concrete matter. In the ads that I use, that which is represented, that is, the supporting signs and signifiers used to sell something are, at best, indirectly tied to the generic product at hand. They represent an idea, not the image represented, or even the product being sold. The connection is tied as a consequence of the context- nothing more.

This paper brings attention to my process of employing the appropriation, compression, and decontextualization of mass media imagery. The "objet petit a" series is comprised of digitally layered images that result in the erasure of an idea or commodity, taken out of context from what a TV viewing audience would consider normalized and concrete. I re-appropriate the signs and signifiers that were co-opted by advertisers to sell predictable and normalized commodities to an original state of sublime beauty.

Information systems within the context of capitalism, or, as Fredric Jameson calls "millionairism" has resulted in the normalization and commodification of all components of life. This has created great confusion regarding the very nature of our existence, destabilizing our perceptions of self, body, desire, and the social.

My artwork encourages interaction, offering the opportunity to engage thought, and a space for the individual to check and consider conditioned responses: like trauma. While automatic response and recognition is necessary for advanced thinking and rapid placement of information moment by moment, it also leads to automata – mindless, thoughtless behavior.

The ever-heightened velocity of images and ideas presented to us by mass media discourages analysis and promotes amnesia. The pleasure reflexes gleefully consume data like sugary soda pop. Memory doesn't fail- it is merely unnecessary. I use signs outside of their trusted, codified systems, devoid of time, stripped of context, and re-present nothing but what is in the image. Frozen video stills of blurred landscapes forces at the very least interpretation and analysis, and at the most, pure experience. For some, to experience the Real is an experience of the sublime, through a momentary revelation of the immense power of the natural world or of the divine.

The blurred image is as desirable and untouchable as the ad. And yet, unlike advertising, which render us always incomplete, this traumatic experience of an encounter with the sublime distances the individual from their habituated modes of perception and response.

Using the familiar is meant to create an oscillation between the habitual and the existential. By using the language of a purely contemporary experience, in this case, exploited data that has been created for entertainment, for supporting market capitalism and fear in television ads, I hope to refer the audience back to their own experiences, to disrupt it, to "expose it; … [that I] might reveal its automatism, even its autism" (Hal Foster, Return of the Real), and to offer a space for conscious action and choice. The experience of an encounter with beauty thus reveals the flattening of the human soul caused by exposure to mass media.

It is here I wish to create a space for the audience to come in contact with themselves, to feel themselves *experiencing* and room to reflect on their conditioned responses.   Codified media images are sublimated to market whims, and create a self-loathing rooted in existential malaise. My work aims to strip the images of their consumptive value in order to offer new experiences that will contribute to new ways of seeing oneself. The resulting images epitomize the ineffable. An exquisite little object to own called experience. The "objet petit a" series is meant to be a return to the flesh.

As in JMW Turner's famous painting Snow Storm: Steam Boat off a Harbour's Mouth, 1844 (coll: Tate Modern) where the only sign of Modernity is blurred and thus reveals the luminous brilliance of Nature, contemporary artists resist cultural amnesia and objectification through deliberate attempts to fight the

inversion of the human spirit. This process is one of utopian remediation towards memory instead of cultural amnesia and the objectification of the human to presence within the flesh. The space provided by these contemporary artworks redeem the soul and offer a transcendent experience of the sublime.

The collapse of time, space, and matter has been a desire of scientists and inventors for centuries. The time machine, transcendental mediation, and metaphysics, are all means of escaping the corporeal, the gravitational pull of the earth, and a freedom to exist in/on new planes of consciousness. In Buddhist practice, there is a constant move in the direction of experiencing the Real, to let go of earthly attachments, to let the pain in and to let it flow through, rather than being pushed out. For some, to experience the Real is an experience of the sublime, through a momentary revelation of the immense power of the natural world or of the divine. Through art, I seek to create a space for reflection, and an opportunity both for the audience to leave their bodies and to return changed. All images end at the flesh.

OPERA & THE CULT OF THE DJ

Justine Poplin

Video as projected light form can 'be' the Diva and take on its own physical presence. By using projection as a vehicle artists can initiate an alternate dialogue by creating a screen or screens that are physical in presence and through this physicality take on their own psychological space.

Fig. 1. Swimming in Foreign Places, 2000, Justine Poplin, Video Installation: custom made screen: cotton & pvc 1m × 1m Melbourne Australia © 2011 Justine Poplin.
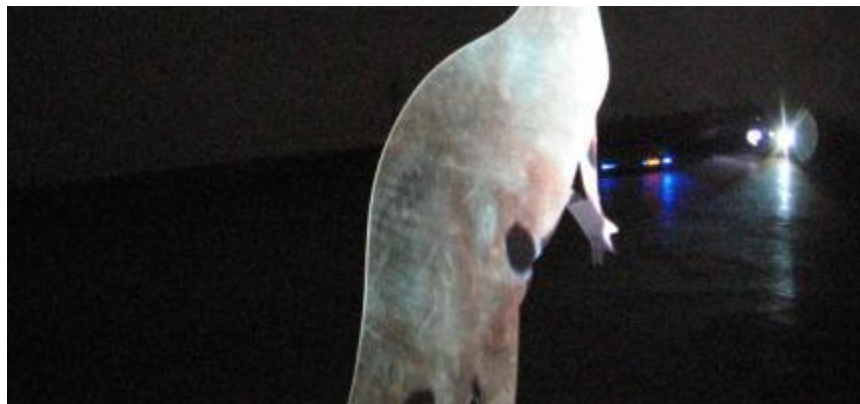
Fig. 2. Habitat: Being the Alien, 2006, Justine Poplin, Video Installation: custom made screen: Perspex 152cm x 160cm x 2cm Beijing China © 2011 Justine Poplin.

 The title of this paper 'Opera & the Cult of the DJ' was chosen to initiate a dialogue and to question the place of Opera in today's culture. The word opera in Latin simply means 'a work'. So, what is opera in the 21st century when opera is the amalgamation of all arts and supposedly a reflection of the times? It could be stated that the DJ or VJ for example is the contemporary New Media Diva. Michael Rush points out, that Bill Viola's video works are "explorations of light and form, matched by his interest in spiritual source material." [1] Video as projected light form can 'be' the Diva and take on its own physical presence if used in an extraditional way. There are several Artists that will be discussed throughout this

paper that are making work that embodies a physicality in video projection, later I will discuss how video's physical presence became one of the driving forces of inquiry in my own work.

Artists working in the field of video art and new media have at times limited the creative outputs of their work exhibited in the gallery or public space by the notion of 'the screen'. The screen I am speaking of is generally rectangular in shape within the interface of a computer screen; or majestically projected onto flat, uninspiring surfaces boasting an aspect ratio of 4:3. There are however; other possibilities that artists have explored to create 'physicality' in projection, which extends preconceived notions of screen-based culture. Video projection can engage in creative strategies that push boundaries that extend the message of the medium. The patron saint of the digital age (Wolf, 1996) Marshall Mcluhan theorised that media is an extension of the human body. "Just as clothing is an extension of the skin, the axe is an extension of the hand, and the car is an extension of the foot, the media are extensions of the mind." [2] An example of this is Australian artist Stelarc he has taken Mcluhan's theory on literally in his own work where he digitally and/or mechanically extends the human body. We can re-contextualise 'the media' to assume the position of media/medium/new media/ video.

Video art and the New Media discipline have evolved significantly since Nam Jun Paik's shooting of the Papal visit to New York with a Sony Portapak in 1965. The seminal action of showing a slice of life in a public space by an artist created what we now call Video Art. "As collage technique replaced oil paint, so the cathode-ray tube will replace the canvas." [3] Paik became the first spokesman for video art and re-conceptualised the use of television as a medium by spiritualising and sculpting with the monitor. His work explored Fluxus ideas and the cinematic avant-garde that were new to the audience of the time. However, it wasn't until video projection was available and accessible to the artist, which in turn extended the possibilities of video to create a physical presence with video projection. "Video installation Artists are producing environments as itineraries, places to start thinking about art and life, rather than giving us maps that indicate where all the answers are." [4] Video installation can be an environment where the screen is in the centre of the room and the audience/viewer can freely roam and not have to view from a fixed position. Video installation with the use of projection creates a physical form in the exhibition space or installed environment. By using projection as a vehicle artists can initiate an alternate dialogue by creating a screen or screens that are physical in presence and through this physicality take on their own psychological space. This physical presence is illustrated in most of Tony Oursler's work and his video installation 'Influence Machine' 2006 is one example. Oursler projects video onto smoke from a smoke machine; the viewer can freely circumnavigate the work in its holographic–like, free-form state, illuminating video's post-human presence through projection. Oursler's "general theme was to mimetic technology, that is, technology that could be perceived as a direct extension of psychological states." [5] In video work such as this created from projecting pixels onto surfaces that are free-standing take video out of its rigid realm into the transcendental and phantasmagorical.

My interest in extending the possibilities of the projection screen began in my first year at university. At that time I was constructing screens or boxes that were freestanding and would sit or suspend. These were made from heavy gauge fishing line and cling film/wrap. I then projected onto and through these assemblages and the projected light would penetrate the installation and dimly leap onto the nearest wall. This was in 1991 when we were still using linear editing techniques and back projection screens were something quite magical. I then moved on to construct screens that still resembled a similar aspect ratio to a standard monitor but had them hanging or suspended in the gallery or public space. The audience again could choose a viewing point, as there weren't any seats or a bench to sit down on like what are offered in many galleries. I made several works from 1999 – 2006 that worked with these principles. It has taken many years to reach this point as the practice and passion of 'being' an artist has worn thin

on my post 30 approaching 40 year old bones. I trained as a singer from 12 – 22 years of age and was on the path to becoming an opera singer. However, when it was time to choose a university and to plan the next decade or so I chose art instead of music. I entered art school on my painting merit and embraced foundation year with the sheer choice of courses and experimented with photography, film, sound and video. I continued to pursue a connection and my Masters examined Multimedia and the Operatic Form. This led me to explore concepts of the voice and performance as realised through new technologies and cross-disciplinary means of presentation. Most of my work alludes to 'physicality' in projection, which extends preconceived notions of screen-based culture. A selection of work from this period will be discussed; the first two pieces Shower Songs and LaLaLa are traditional screen-based work. Swimming in Foreign Places, My Beautiful Laundrette, Vox Pop Environ and Habitat/Being the Alien are work that embody Opera and the Cult of the DJ and extend projection possibilities.

Futurist performance artist Marinetti showed his work 'Feet' in 1915. "To compress into a few minutes, into a few words and gestures, innumerable situations, sensibilities, ideas, sensations, facts and symbols." [6] Marinetti's work inspired the video installation 'Cropped'. Two custom made screens hang in the centre of the gallery space. Performers are shot from the waist down in bars, cafes and other public/private spaces. Cropped surveils the body language that takes place under the table. The placement of the projection screen was crucial to the work. A perspective that was normally reserved for under the table was now subverted to eye level. The screens were suspended in the centre of the space, so that projection could be seen from 360 degrees angles extending projection physicality in the space.

There are many artists that use song in their video work. Is this then the opera of our generation? When the word opera is used it often conjures up images of overtly theatrical stocky men and women gesticulating wildly and extending their voices with trained prowess. The use of voice and song as an art form has been used in the avant-garde performance work of Meredith Monk; John Cage, Laurie Anderson and most recently with Turner Prize recipient Susan Philipsz in 2010. These artists used techniques such as vocal extension, amplification and sound recording to create song and sound that crossed genre. This cross over became quite popular in Australia in the late 90's early 2000 with Artists such as Philip Brophy who in his sardonic satirical critique says, "An artist using a pop song in video art is like anyone either enrolling in a DJ course or wearing an iPod in public: Tragic." [7] Brophy's combination of buzz words; song, video, Dj and iPod all in one sentence have a resonance and cadence, as these elements are a prevalent reflection of art and culture today. Artists can work with these contemporary elements to transcend the 'tragic' to become more engaging by harnessing this cross-fertilisation of genres and extending projection possibilities.

American artist Robert Whitman's work 'Shower' 1964 is one of the earliest examples of the shift away from the cinematic experience of film and into projection possibilities in projection in installation. It was only after I made the work Shower Songs that I found Whitman's work. Shower Songs is an Audio Visual Environment that was created for 1st Floor Gallery in Fitzroy Melbourne, sound recording by Jennifer Sochackyj. In this work, video was projected onto the gallery wall. The position of the projection was on the inner corner of the wall wrapping the 90-degree angle. This work demystified the singer having them tangible and in a familiar space. The bathroom is usually a scene of intimacy and exposure of fragrant wet white lathers, of glass, ceramic, curtain, Hitchcock and song. The viewer is taken into a steamy, aural, visual environment where several people sing and bathe. Is it erotica, routine, love-scene, post-coital wash-down or recitative?

La la la is a screen-based work that explores voice and presentation. What is good pitch, tone and timbre when they can be digitally altered? What is a good voice? In an overexposed room flooded with light 9

performers sit in front of the camera one by one and repeat a sequence of 3 notes, that are played to them on an analogue Dictaphone, an aural examination of the recognition of time and pitch. A screen test. Each shot is a tightly framed over-exposed headshot. The close-up composition was used to create tension and to put the viewer in the place of the singer. Ultimately each singer's 3 notes la la la were edited audio visually constructing a composition that lasted for as long as the average pop song 2'33.

Swimming in Foreign Places was a site-specific work curated by Camilla Hannan and Nat Bates (Liquid Architecture). There were two sound artists Hannan and Bates and two video artists Van Sowervine and myself. The couplings were to perform a live surround sound mix to pre-recorded video. At the time I was reading a lot about Bauhaus and Dada performance and came across László Moholy-Nagy "Nothing stands in the way of making use of complex APPARATUS such as film, automobile, elevator, airplane, and other machinery, as well as optical instruments reflecting equipment, and so on. It is time to pro-duce a kind of stage activity which will no longer permit the masses to be silent spectators, which will not only excite them inwardly but will let them take hold an participate—actually allow them to fuse with the action on the stage at the peak of cathartic ecstasy." [8] Laszlo inspired the work I created for Swimming in Foreign Places. I custom-made a circular screen that hung in a tree like a strange fruit. The projection started with a gradual ripening of colours from green to earthy browns this being used as a metaphor for a fruit ripening on a tree. After several deaths of fruit a tightly cropped singer's headshot appeared. The head (the artist) was hanging in the tree singing a song without melody. This was layered with sur/subtitles taking us into a place not many of us have been. The lyrics projected were from Abel Meeropol's 1936 poem, which 3 years later became the well-known blues ballad 'Strange Fruit' sung by Billie Holiday.

My Beautiful Laundrette performance installation is a site-specific work. Behind the doors of an after hours laundrette in Melbourne, a piano introduction to a Mozart aria from The Marriage of Figaro is au-dible. Two whopping speakers spill the melody into the street. The audience assemble outside (the doors are locked). Inside the dimly lit laundrette the diva is plugging in pieces of equipment preparing for the performance. The aria she will sing is from an opera where the character has lost a pin; she has misplaced her stereo jack, and ponders whether the mix is good. She is standing behind a dj booth wear-ing a powdered wig, mixing herself into the soundtrack with karaoke sur-titles on the custom made screen above her head. The aria ends and other lyrics appear on the screen, another Mozart aria 'Batti Batti', then Kate Bush's 'Hounds of Love', followed by Britney Spears' 'Hit me Baby', all songs are about love, all sung by women and all transcending time when seen in text form. Voltaire once said: "anything too stupid to be said is sung". Seeing the lyrics displayed in this form whether classical or pop amalga-mated the texts and made one no higher art form than the other, a blend of genres transcending time.

Vox Pop Environ is another site-specific work that was made for a Melbourne pub's disco room. Man-zoni, the artist who is most favourably know for selling shit, sold his bodies of air (artists breath) in the 1960's for 3000 lire and he wasn't a singer. 'Vox Pop Environ' digitally replicates and projects the ges-tures we use when we sing; the eyes, the mouth, the hands, all vehicles for external physical expression, the mechanisms > the trachea the vocal chords the diaphragm hidden. Multiple projections of operatic gestures were projected onto balloons (the screens) atop slim wooden rods with a plaster base. The singer is now a balloon (a diaphragm) on a stick inflated by artists breath, performing to a pre-recorded soundtrack composed from voice samples, extending vocal performance and projecting a physical per-formative presence.

I further examined extraditional notions of screen culture and performative presence in 'Habitat/Being the Alien' exploring notions of cultural identity. If you are Australian what exactly does that mean and

what image do you portray to other cultures? In China if you introduce yourself as Australian, most Chinese immediately say "kangaroo" – big rat. The work is a dialogue between the lyric and the visual. I created masks around the standard format of the rectangular workspace in preparation for the projection. The first mask was surrounding the kangaroo this mask was black as black does not project. This gives the screen the illusion of a freestanding kangaroo and in turn initiates a physical presence in the gallery space. The second mask was inside the kangaroos face; here I inserted moving footage of a face speaking, uttering and gesticulating with various marsupialistic facial expressions. The soundtrack created was ambient Australian bush sounds mixed with utterances in Chinese and Mandarin about wanting, waiting, and missing someone or something that give a sense of disconnection, longing and isolation. Songs and the land make us; we are defined by our culture and history. There is a sense of displacement and familiarity, knowledge of being an alien that creates a dialogue between the lyric and the visual.

The work I have discussed was made over a very intense period of time; I was investigating multi media and the operatic form examining the place 'opera' in 20th –Century Art. The work created mostly explored the use of voice in contemporary art whilst simultaneously extending methods of presentation to reach a broader audience. The hybridisation of new media is synonymous with the way we live our lives. There will always be a place for Opera in its historic sense for dramatic deaths and augmented librettos with 15 year-old Japanese girls falling in love with polygamous American sailors. There are also many contemporary Opera companies that John Jenkins and Rainer Linz discussed in their book 'Arias – Recent Australian Music Theatre' 1997 that employ video and new media in their work. However, these still mostly follow pre-existing conventions of opera, such as having Directors, Designers and Composers. To reiterate, the word opera simply means a 'work' and in the current climate of cross fertilisation of art forms this leaves a lot of room for artists to interpret and create works that reflect this. "The concept of the moving, temporal image is a key modality through which artists have articulated new strategies and forms of image making; to understand them, we need to fashion historiographic models and theoretical interpretations that locate the moving image as central in our visual culture." [9] Opera and the cult of the dj is a reflection of the times and work that uses technological devices that extend the possibilities of video installation and its physical and psychological presence in a space. This in turn creates a shift in the expectations of the viewer and preconceived ideas about opera/multi -media and modes of presentation in the 21st-century.

References and Notes:

1. Michael Rush, "Chapter 2: *Video Art: New Media, Conceptual Video and Personal Narratives,*" in *New Media in Late 20th Century Art* (London: Thames & Hudson, 1999).
2. Donald A. Fishmann, "Rethinking Marshall Mcluhan; Reflections on a Media Theorist," in *Journal of Broadcasting & Electronic Media* 50, no. 3 (2006): 557-574.
3. Michael Rush, "Chapter 2: *Video Art: New Media, Conceptual Video and Personal Narratives,*" in *New Media in Late 20thCentury Art* (London: Thames & Hudson, 1999).
4. Mark Pennings, "Video Installation Networks," in *Photofile Contemporary Photomedia + Ideas*, no. 74 (2005): 56-57.
5. Tony Oursler and Louise Neri, "Smoke and Mirrors: Tony Oursler's Influence Machine: A Conversation Between Tony Oursler and Louise Neri," Tony Oursler's Web Site, May-July, 2001, http://www.tonyoursler.com/files/louiseneri(3).pdf (accessed April 12, 2011).
6. Roselee Goldberg, *Performance Art from Futurism to the Present* (London: Thames & Hudson, 1979), 26
7. Philip Brophy, "Curating Video Art 101," in *Photofile Contemporary Photomedia + Ideas*, no. 74 (2005): 80.
8. László Moholy-Nagy, "Theater, Circus, Variety," in *The Theater of the Bauhaus,* eds. Walter Gropius, Arthur S. Wensinger, 49-72 (Baltimore, MD: The John Hopkins University Press, 1996).
9. John Hanhardt, "Nam June Paik," Nam June Paik's official Web Site, http://www.paikstudios.com/essay.html (accessed June 10, 2011).

NEW MEDIA CONTEMPORARY INFORMATION PARADIGMS: THE REORDERED MEMORY ON FILE ARCHIVE STRUCTURES

GABRIELA PREVIDELLO ORTH

New Media contemporary information paradigms, leads the discussions that increase the perceptions about digital art Memory content, highlighting the FILE Archive, under the perspective of intelligent systems. With an Information Science theoretical approach, the study will raise perspectives in using these expert structures, considering the recent goals to develop a new FILE Archive environment.

"(…) the technologic machines of information and communication operate in the core of human subjectivity, not only within their memories and intelligence, but also within their sensibility, affections and unconscious ghosts." [1]

From Information Science point of view, this study on the cultural practices of the contemporaneity incorporates the fluidity of its research object: The electronic and digital art archives, considering here the postmodernity highlights in the information, its constitutions of mediation and access.

In this sense, the digital art information environment works its discursive communities, providing directions for its flow. This flow, which inserts its agents in culture and technology issues mediated by the information device, enables the reflection of these agents in its emancipation instruments. The parameters for this reflection are not individual, but subjective.

Art document intermingles with artwork and artwork becomes a means of art documentation. As well as the contemporary dialogue between men and machine, the memory diachronies rebound on individual and social spheres. The contemporaneity reorders the memory. In this logic, the memory is the future and its present comprises all the histories, emphasizing the randomness of the information flow in contrast with its stable linearity. The examination of this flow through digital Documentation asserts the development of the field through signification routes and provides its contextualization in the technological tools that are absorbed by it.

The digital art archive is manifested as the nature of its works. It has a memory importance, a variety of concepts and a heterogeneity in its exhibition standards which asks for an intelligent system model that operates with several types of media and languages. In today´s archives and Documentation centers of digital electronic art, spaces still not interoperable are being designed and constituted individually as assorted pieces waiting for their whole. This isolated information requires a complex reading of its connections.

Distinguishing the potentiality of the artistic objects, while producing new artworks and communicational flows, is a way of Documentation. The potential elucidates the appropriation of memory and stimulates the generation of knowledge.

In the analysis of electronic and digital art information environments, the complexity concept is present in their Documentation structures. Parameters for information treatment and flow will be addressed under the FILE Festival perspective and will be contextualized in the digital culture memory axle.

The Festival gathers works of aesthetic expression that are diversified in the following areas: artificial life, hypertext, computer animation, games, interactive movies, digital panoramas (360° photos), electronic and robotic art installations, in interactive and immersive rooms. FILE Festival also organizes in each edition the FILE Symposium with several theorists and artists of digital culture presenting their researches and since its last edition, with the creation of the FILE PRIX LUX, it awards best Brazilian and international works registered in electronic and digital art.

The digital electronic art works documentation initiative has been happening since the first event edition (2000) and prioritizes access to the works presented in the Festival through its website. [2] In this web interface, the Festival promotes a fruition environment in digital culture through the navigation in two main search environments: an Archive database and the Hotsites produced annually for each edition of the Festival.

In this environment, connections are available for the conceptual overview of the work, artist's biography, photo and for the work itself, if it is online. This is the interface available for the user through web environment or in digital art centers such as the Oi Futuro space in the city of Rio de Janeiro. [3]

FILE does not own art works of these databases and in order to be exhibited again they have to go through a new negotiation process with their copyright holders, whom may be artists, collectors or research institutions. For an immersion through the categories of works and their contexts, the interfaces available are the websites of the previous editions.

From the documental point of view and for the access of the Festival professionals to the information available, data is organized as a reflection of the exhibitions. The FILE Archive mission is guided under the perspective of audience and works presentation. Information is inserted in system through registration forms that are filled by the authors. In these forms, there is the first (conceptual and technical) information about the work and also about the artist. These forms are a guide during the whole process of trusteeship and organization of the Festival. It is signed by the work copyright holder, allowing the work exhibition in both the festival and the web interface. With the exception of installations, the works are sent through FTP and start to integrate the Festival off-line collection.

From the choice of works until the exhibition opening, the works selected are indexed in a second database that feeds the website, the main interface of audience and researchers with Festival content. Attached to information of databases, Festival documentation consists on technical detailing information sent by the artists that is complemented by email exchanging among artists and Festival coordination crew. The assembling guides, concerning digital art works Documentation, are the core of the work preservation, once they will allow the works to be emulated or recreated in current exhibition conditions in the future, keeping the original conceptual and technical parameters of the works.

On Documentation context, photos and videos registering Festival editions are also filed, as well as catalogs and media clippings of the event, with part of equipment and all production and management documentation of the event filed separately. The theoretical contextualization that inserts the works in digital scope culture occurs through the documentation of articles presented at the Festival Symposium and articles electronically published in the event magazine, as well as books that are launched in each edition of the Festival.

It is important to highlight that FILE Archive has been structured on the Festival exhibitions.

Considering the described informational environment of FILE Festival, the information flow privileges the complex body of works annually registered, comprising the inherent heterogeneity of culture production in the electronic and digital information environment. The documents were selected in an organic and decentralized way, keeping above all, the relation between information, and perception of their totality.

In this moment, FILE Archive is an instrument for curators and also promotes FILE Festival. It also intends to serve as a research information instrument and for that it is focused on its own collection through documentation practicing view, prioritizing cultural contextualization and dynamically monitoring the information flow, which nowadays has intense circulation.

This documentation apparatus tends to become more dynamic and instable. Working with its structures and boundaries demands some contact with the perennial and some dexterity by dealing with the rhizomatic axle that is present in these environments.

These environments are made of interactivity, constant updating of their means and replica potentials of their content, being presented as possible transition systems for the future intelligent network machines. This is not about eliminating all linear documentation, but to build one more layer of informational axle, stimulating the production of memory instruments and interacting in the knowledge sphere provided by Art.

File Archive environment will focus on information transmission and in the potentiality of its objects, absorbing a nonlinear indexation, thus allowing users to become independent on their readings and representations of subjectivity through an interactive relation with the environment. For non-expert interlocutors, the intelligent automation of information flow offers a large amount of entries and possibilities of appropriation of its content.

In general, FILE Archive works nowadays on some guidelines such as: physical treatment of the artistic object and its digital support, expansion of information organizational tools (Topic Maps, Ontology, Controlled Vocabulary), creation of a free codes repository available by artists and creators, linking of theoretical production to scientific universities databases and documentation focused on the production of new works and research. Besides these practices for archive content treatment and diffusion, there is the intention to expand communication channels of FILE Archive with other institutions, professionals, artists and all community involved with the digital electronic art and its developments.

Digital Art archives may also serve as a parameter to other archive areas, from the research in their objects to the analysis of their structures, which present a complex and multimedia nature. "The art humanizes the machine" [4] and in the case of the digital art informational environments such as the FILE Archive the relations among document, technology, art and their interlocutors are considered an important axle to electronic arts Memory, stimulating the creation of new works and keeping the interaction of their actors dynamic and creative.

References and Notes:

1. *Félix Guattarri, CAOSMOSE: Um Novo Paradigma Estético, trans Ana Lucia de Oliveira and Lúcia Cláudia Leão, (Rio de Janeiro: Editora 34, 1992), 14.*
2. *File Festival's official Web Site, http://www.file.org.br (accessed September 3, 2011).*
3. *Oi Futuro's official Web Site, http://www.oifuturo.org.br (accessed September 3, 2011).*
4. *Frank Popper, Art of the Electronic Age, (London: Thames & Hudson, 1993), 180.*

CITYSCAPES – EXPLORING THE SPIRIT OF URBAN IDENTITY

Francesco Proto & Richard Vickers

Turned into a mere relic of the modernization process, contemporary cities have stopped providing answers for the people they were meant to serve. Static, often imposing and inscrutable, the city is now a sphinx whose silence costs lives in terms of the psychic response to their complexity and size; most poignantly, to the isolation they engender.

INVISIBILE CITIES: TOWARDS AN ARCHAEOLOGY OF PRESENT TIMES

1.0 THE NARRATIVE

Turned into a mere relic of the modernization process, contemporary cities have stopped providing answers for the people they were meant to serve. Static, often imposing and inscrutable, the city is now a sphinx whose silence costs lives in terms of the psychic response to their complexity and size; most poignantly, to the isolation they engender.   In light of this, the research is framed to uncover how people extract meaning from the built environment and how, in an act of reciprocity, the latter underpins their identity. The goal is to develop an original analysis of the role of contemporary cities in shaping and supporting western lifestyles through the representation of architecture in cinema. A series of short films will constitute the final research output. Shot in significant metropolitan areas around the world, they will illustrate the theoretical background underpinning the whole endeavour in critical theory, visual culture, cultural studies & psychoanalysis.

The starting point of the whole project is Italian writer Italo Calvino's Invisible Cities, a novel intended as a collection of descriptions of the cities that the Venetian explorer Marco Polo visits within Kublai Khan's vast empire. Based on the original The travels of Marco Polo – travel diaries recording Polo's journeys through the 13th–century Mongol Empire –Calvino's book is a reflection on contemporary cities as these become invisible to the eye: buried as they are under an interior, "represented" city, the real city disappears beneath a thick layer of fantasy. Such is the case for Venice, for instance, its Disneyfication rendering the true Venice virtually invisible. Hence,"[t]he only way to get at Venice is to use the water – its refractions, reflections, the play of light and shadow, and to re–create Venice where it has always been strongest – in the imagination" (Winterson : 2001).

It is thus clear that, to Calvino, stories, memories and signs always replace, cover and erase the real city, thus turning the latter into "the trace or track" of something "which is forever absent" (Spivak, in Welsh : 2007).

There are in fact:

the city of dreams;
the city of memory;
the city of desire;
the city of history;
the city of the future;
the city of destiny;
the city of simulacra

the city of spectacle;
the city of consumption, etc

In other words, everything but the city as such. Invisible cities are in this respect nothing but a catalogue of obstacles impeding an "unmediated" perception of the world – as Calvino would put it – each city existing as a metaphor for the "invisibility" of experience. As a result, not only is the experience of the real city impossible; but also dependent on a form of obliteration, of erasure, of 're–writing' of the 'real experience' that, at the end of the day, is all encoded in this very act of re–writing as such.

2.0 METHODOLOGY

Bearing in mind that for French psychoanalyst Jaques Lacan re–writing is a therapeutic mechanism meant to aid recovery from a trauma, it appears that the city has become a massive exemplar of automatic writing, its inability to provide answers being a symptom of that disconnection from reality now days affecting us all. The question thus arises of how to decode it; ie, of how the city is perceived by the observer, which is overall our ultimate aim. The answer is twofold: on the one hand, we have summoned up a model derived from psychoanalysis, ie Sigmund Freud's "interpretation of dreams"; on the other, the cinematic act as an irreplaceable means for doing this.

2.1 THE FREUDIAN MODEL

With regard to the dream–work, Freud used to distinguish between a dream's manifest and latent contents. That is, given a sequence of images as the apparent narrative of a dream (manifest content), it is possible to draw out of it a number of interpretations (latent content). Manifest and latent contents from a dream therefore overlap, although both are perceived as if part of a continuum; and indeed they are, if it was not for the fact that, according to the psychoanalytical model, a dream is subject to interpretation so as is a film. There is, in this regard, a parallel we can draw between a dream and movie, this parallel being based on the narrative (sequence of mages) both are based on. To interpret a dream means in fact to chance its structure exactly as to interpret movie means to change its montage. And it is starting from this assumption that a movie can represent the way our mind works.

On the other hand, the dream–work is never objective; to the degree that the meaning of an image is always affected/distorted by subjective drives and individual history. Hence, the very idea subtending out project: to employ a film to mirror the way in which a dream-work works, under condition that the stimuli aroused by a city are such as to put us in a dream–like state.

This position is particularly clear in Inception, a film in which not only the dream–work is represented as a kind of onion–layered nucleus (beyond the latent content of a dream, another follows, and another,

and another); but such layers – or "levels" (as they are called in the film) are always 'infested' by the dreamers' "projections", i.e. elements belonging to the dreamer's personal history that "colour" the dream-work with ever different meanings.

Once we have established that what we perceive of a city is never a mere sequence of images, but rather the multi–layered overlapping of personal projections, the problem arises of how to "decode" the manifest experiencing of a city. To us, cinema holds the key. Not only because a film is, by its very nature, the thing most similar to a dream; but also because its particular structure, based mostly on montage and film editing, allows for the simultaneous presence of different layers of images, thus resembling as closely as possible the interpretation the research proposes of the city as multilayered field of experience.

2.2 THE CINEMATIC TRANSCRIPTION (OR RE–WRITING)

Sergei Eisenstein, the Russian filmmaker famous for his pioneering film theory, wrote that film montage always represents a moment of "explosion" of the image; ie, the very moment where a film sequence (as a situation, or event), is decomposed into juxtaposed images to reveal the inner meaning of the sequence. It is easy here to draw a parallel with Freud's dream–work and, from the latter, with the model of perception we have indicated for the city: the cinematic montage can operate definitively as a metaphor to illustrate/articulate the multi-layered compression of meanings. However, what we are interested in is exactly this idea of the image's explosion; ie, the possibility of making the latent content of the dream–work available in the form of a hypertext. Hence the use of use of cinema as a means to accomplish this task.

3.0 HOW THE SUBJECT EXPERIENCES A CITY

The methodology rests on the subject–ification of the camera's eye. The short films, in other words, will make objective a condition of generalized unease that is difficult to grasp unless visualized. The films seek to act as an imaginary "screening" in the mind of the beholder, thus "visualizing" the mental and emotional associations that the experiencing of contemporary cities arouses. It is in this respect that the cinematic short will act as a hypertext able to make visible an invisible process: the overlapping between visual stimuli and the random/rational associations the former provoke in the mind of the observer. The final aim would be to provide an account of the impact that the contemporary city has on its user/consumer, thus highlighting the broadest range of experiences possible.

References and Notes:

1. *Italo Calvino, Invisible Cities. (London, Harvest, 1974).*
2. *Sergei Eisenstein, Film Form: Essays in Film Theory. (London, Harvest, 1977).*
3. *Sigmund Freud, The Interpretation of Dreams. (New York: Avon, 1998).*
4. *Christopher Nolan, Inception (film). (Warner Bros, 2010).*
5. *Marco Polo, The Travels of Marco Polo. (New York: Everyman's Library, 2008).*
6. *John Welsh, "Erasing the Invisible Cities: Ital Calvino and the Violence of Representation". (2007) http://repository.upenn.edu/cgi/viewcontent.cgi?article=1008&context=wproml&sei-redir=1#search=%22welsh%20invisible%20cities%22 [Accessed August 2011]*
7. *Janette Winterson, "Invisible Cities". http://www.jeanettewinterson.com/pages/journalism_01/journalism_01_item.asp?journalism_01ID=171 [Accessed August 2011]*

BEYOND PARADIGMATIC SHIFT: MAPPING CULTURE AND SOCIETY OF DIGITAL AGE

Mikhail Pushkin

Global paradigmatic shift is triggered by advances in digital and network technologies. New, Inherited, enhanced, and discarded features of this paradigm are presented. Digital Age is synthetic with features from modernism, postmodernism and earlier paradigms. The argument is supported by referencing modern, postmodern and contemporary theoreticians. Neo-Marxist criticisms are used to identify the distinctive points of the new paradigm.

Introduction

Making sense of one's own contemporary society and history, forming a coherent holistic image is a complex task, as one is situated "inside the box" of their timeframe, blurring the boundaries of perception and evaluation. Present day individual, however, is faced with an even more difficult condition: that of living at an early stage of an entirely new paradigm. Neither modern, nor anymore postmodern, yet bearing traits of both, our age is evasive of classification and not apparently structured and definable. Precluding the possible postmodern criticism of the need for 'constraining' definition and structuring, one may only point out that we have to establish a system of shared signs and signifiers embedded into a coherent framework to rationalize the principles determining global and local processes surrounding us, even if not fully accurate or all-encompassing. While no theory will likely ever be the universal solution, only through understanding and by now at large reconstruction of post-postmodern reality, will we be able to make conscious effective improvements and take full advantage of social, scientific, cultural and technological progress.

Multiple New Paradigms

Having the advantage of retrospective makes it easier to structure and comprehend previous paradigms, making them appear more coherent, holistic and identifiable, though not in simplistic static homogenous terms. Like the Renaissance or Enlightenment, present Age already has several names, signifying its core elements, its catalysts: 'Digital' Age, 'Information' Age, 'Computer' Age or 'Network' Age. This equivocal yet evident paradigmatic shift leads academicians to generate possible interpretative post-postmodern frameworks coming with a range of neologisms like "digimodernism, pseudomodernism" (Kirby), "remodernism" (Childish & Thomson), "altermodernism" (Bourriaud), "third wave" (Toffler), "neomodernism" (Heller, Grauer), "new sincerity" (Epstein), "posthumanism/transhumanism" (More), "hypermodernity/supermodernity" (Eagleton, Augé). Combination of the stronger sides of these hypotheses is one of the better strategies to develop a solid holistic paradigmatic framework. For instance, Kirby's digimodernism (skeptical, media, culture and society-focused) combined with the third wave of Toffler (holistic, positivist, economics-focused idealistic image of further individualized 'hypercapitalism') [1] can be used in mutually supplementary fashion.

Digimodernism has decisively displaced postmodernism to establish itself as the twenty-first century's new cultural paradigm. It owes its emergence and preeminence to the computerization of text, which yields a new form of textuality characterized (…) by onwardness, haphazardness, evanescence, and

anonymous, social and multiple authorship. These in turn become the hallmarks of a group of texts in new and established modes, which also manifest the digimodernist traits of infantilism, earnestness, endlessness, and apparent reality. [2]

"In a Third Wave economy, the central resource – a single word broadly encompassing data, information, images, symbols, culture, ideology, and values – is actionable knowledge." [3] He further emphasizes extreme decentralization penetrating the production and consumption, national identity, state structure, government and even family institute.

Most theoreticians place 'the digital' and 'information' at the centre of the new paradigm readily offering a set of very clear fulcrums for such shift: Internet, Digital Technologies and Networks. Those are the necessary information transport and dissemination arteries, that basis allowing for a formation of new society with distinct features reflected in global and local scale of existence involving politics, commerce, society and culture. Furthermore, the paradigmatic formation follows in part ancient principles, representing a synthetic ('organic' as opposed to postmodern 'eclectic') Hegelian evolutionary process merging modern and postmodern principles and ideas into a complex multisystem structure. Such synthesis is conceding with postmodern critical skeptical stance on monolithic structuralism, yet upholding the principle of multiple resilient potent empowered structures, essentially a pluralized networked version of modern structure concept. As the new paradigm changes the very basics of reality evaluation, its nature appears paradoxical from earlier perspectives with such features as globalization and interconnectedness as well as nearly unlimited information access coexisting with unprecedented growth of distinct subcultures and glocal communities, interpersonal alienation (computer mediated contacts as opposed to direct ones) as well as grotesque phenomenon of global misinformation and possible reduction of factual knowledge through information overload, manipulation and falsification (e.g. Wikipedia and Wikileaks): virtual becomes more wholesome, detailed, real.

Reversing Baudrillard's negative concept of simulacra, digital virtual reality instead becomes a transformative, revolutionary expansion and informative improvement on predigital reality. Internet is therefore providing space for dialogue and a platform for creating new products, which are real, yet within a different framework not necessarily requiring a physical equivalent (in the same way a novel is real, but more complex), illustrating the key element of the new paradigm: shift of value system from physical to virtual, digital, the information pure.

Tetrad and Digital Age

To identify and understand the new paradigm one needs to establish the points of its distinction, to which adapted McLuhan's tetrad concept, originally dealing with medium evolution, but transformed into paradigmatic evolution model might be of aid.

NEW TRAITS

Global interconnected digitized society completely redefined concepts of time, space and identity (an impact comparable to that of the public railroad transportation emergence for Industrial Revolution), forming multiple new value systems within localized social clusters embedded in globalized conglomerate system. Neither local isolated 'tribes', nor global monolithic culture and ideology. Memory becomes externalized, brain and sensory apparatus extended. [4]

Valid illustrations include international academic, research, religious or subcultural communities. They are interconnected through Internet (or only existing online), sharing own value systems, interests, goals. Sometimes such are largely coinciding with mainstream, other times are unorthodox, even radical. The members do not anymore need to be connected geographically or even know each other's real identity. The communication process (not limited to interaction, results in joint creation of virtual or even physical products and services) may follow an arbitrarily established strict or flexible timeline or even be of a sporadic nature (online forum posts). Specific examples would be gamers waking up in the middle of the night to participate in an on-line in-game event, possibly taking place during the day in another time zone. A now frequent situation that can be compared to a late night business phone call to another continent, or a heart surgery procedure broadcast online for education and consulting purposes, or an entirely online accredited international university e-education with over 5000 degrees, all of which illustrate the creation of new value systems and social structures based on virtual space and identity, often more important to their participants than daily routine and in more radical cases basic human health needs.

INHERITED & IMPROVED TRAITS

From media and entertainment domination to the virtual reality hegemony.

With the shift towards virtual space, media reality, as the main venue of infotainment, socialization and trade, World Wide Web becomes a place of value creation, not anymore wholly based on physical reality external to it, not unlike contemporary stock market. This gradually takes global economic structures further beyond post-industrial into global e-commerce with individuals and small companies offering local customized goods and services worldwide [5] , using Internet as the marketing platform. As the digital requires constant research and innovation, quaternary sector becomes more important and profitable with originally smaller software and hardware innovators becoming world-leading multinational corporations such as Google, Microsoft, Facebook and Apple, all forerunners of the Digital Age, skipping the relatively brief postmodernity in their successful development.

Now digital, media goes in what might be described as 'overdrive', shifting the already immersive experience of a movie theatre into portable entertainment-information-communication products (tablets, smartphones, netbooks), while interactive, personalized, customized, individualized and yet pseudonymous news reporters and bloggers are reaching the audience through even more information channels, creating a complete complex system of (not infrequently misguiding, purposefully and otherwise) worldview. Such worldview becomes a custom-tailored massive digital prism, through which reality is perceived and evaluated. One may argue both for and against this prism, as it might either enhance one's knowledge and understanding, or completely distort it. [6]

Extreme customization of supply and demand becomes one of vital features of contemporary information supply and mining with the suppliers struggling to tailor user profiles to serve the kind of information (in simplest cases – direct advertisement) that will influence the audience. The "prosumers," [7] however, gain the power of manually or semi-automatically filtering out the bulk of undesirable information, thus both shaping the supply and demand structure of virtual reality and its products, and gaining a new kind of control over information production, intake and processing. This situation reestablishes the core principles of reality perception and validation arguably reducing influence of sensationalism and misinformation, as contemporary generation is born into reality (not just online) which is by de-

fault virtual, constructed, relative, fostering and necessitating development of new information selection, filtering, processing and validation mechanisms. Such environment fosters exploration and renegotiation of values, facilitating new forms of creativity and consciousness, shaped by the logic of code, as well as confusion inherited from postmodern explosion of nihilism.

DISCARDED TRAITS

Materiality (of information, identity, wealth, property and entertainment), privacy (contrary to the mainstream media-suggested spreading of democracy), copyright & ownership (due to combination of pseudonymity, remote ownership, digitization and piracy) and memorization.

Material reality has most certainly not vanished and global wars for territory and resources are raging at the same or even greater pace (coexisting struggling global corporate capitalism paradigm described by Toffler as the second wave). For the general globalized population, unless personally affected, they directly translate into local oil prices, (un)available vacation spots. What Digital Age adds or rather alters is the virtual presence and virtual active participation: immersive Video Games "recreating" the hot-spot events, blogging and live feed from the hot spot: real and fake so indistinguishable that one cannot anymore take either for reality. In effect, the actions, events in themselves become important beyond earlier more simplistic good versus bad framework. The audience becomes aware of watching or participating in a created narrative, globally pragmatic, rather than locally dramatic, being forced to ask *cui prodest*? On a less political note, one could consider timeless classics of multiplayer ego shooters, Counter Strike, where terrorists and police forces are equally popular with players, stripped of their ideological connotation.

Furthermore, digitized and digital video, audio and textual products can now be created, copied, advertised and distributed manually at virtually no cost via Internet, placing both publishing and distribution houses in a dubious position of trying to survive in a new pervasive global socio-economic system, which has little real need for their dated services. Most obvious examples point to McLuhan's medium tetrad concept with paper-print and DVDs slowly, but surly becoming obsolete, with portable e-tablets (consider clay 'tablets' as ironic reference to antiquity), smartphones and e-readers gradually making books and printouts a thing of the past. Paper-based text is surviving on conservative medium loyalty, multitude of existing production hardware and routines, as well as through the pressure (economic, political, legal and otherwise) of gigantic non- and semi-digital manufacture, publishing and distribution giants inherited from the pre-digital age.

The very notions of materiality and the means of production are taken to such a different level, that one may consider material world to be chasing after the virtual one, curiously reviving and reworking antique debate on mimesis. An ironic illustration is digital cartoons, films or video games, where living actors and scenery are being digitized into animated characters, enhanced and then inhabiting the new better-than-real diegesis of "Avatar" or "L.A. Noire". One can look further into the way contemporary blockbuster movies are structured and presented, as if molded after videogames, which follow almost immediately.

Remote and outsource jobs number increased dramatically both in material and digital/virtual sector (software, finances, IT support). The former, child of industrial age, is becoming ever more mechanized and self-sustaining via digital control systems or imported, while the latter, the new, is locationless in its

core principle: information (now in itself a product) is likely located on a server in some specific geolocation, however, its identical up-to-date copy is likely backed up elsewhere or even distributed among multiple computers world-wide.

Pseudonymity becomes the new identity with customizable optional gender, race, class, location and visual representation (avatar). On a more global level, potent hacktivist groups are formed. The "Anonymous" can serve as the most notorious example: ambivalent global hackers-activists group, networked, decentralized, yet organized (multiple cells and individuals worldwide), effective (able to bring down websites for government security companies, i.e. HBGary Federal and global credit card systems, i.e. Visa and MasterCard), with own moral principles system, e-anarchic.

Lastly, Internet has already integrated itself into the core processes of human mental activity beyond simplifying communication, but acting as a gigantic "External hard drive for the brain". [8]

RETURNING TRAITS

Dialectical, 'textoral' in its earlier phase culture of "global village" becoming "global theatre," [9] community, holistic thinking, social responsibility, layman philosophizing.

While Internet communication seems to alienate people from their direct physical environment, it at the same time facilitates and intensifies communication with a much wider audience based on interest, rather than random chance. Multiple blogs, forums, social networks demonstrate rebirth of, now online, communities, which become centers of heated debates on global and local issues, suggesting growing popularization of dialectics. Members of online communities are responsible to abide by the rules set out in the said communities, fostering a new sense of social responsibility, usually without harsh consequences, providing a safer environment for personal growth (or leading to infantilization in young adults due to lack of harsh consequences). At an early stage of digimodernism the main bulk of communication is textual, though the nature of communication could be seen as a multivocal enhanced oral one, only written down. There is, however, no reason to assume that with further advance in audio-video digitization technologies text will not once again give in to the oral and visual communication.

Even the family institute goes through a similar transformation with a curious rebirth of arranged marriage institute moving from the hands of the parents into organized or automated virtual matching sites and portals offering any kind of partnership pairing.

Marxist Angles

Marxist and Neo-Marxists are notable for the skeptical angle frequently downplaying the role and magnitude of change in their eternal struggle with capitalism. Gramsci further develops Marx's theory of hegemony, presenting his contemporary world order and class-culture-production system as an adapting self-sustaining flexible construct, maintaining that social order by making subjugated classes internalize value system of the ruling elite. His theory permits one to see a contrast of new hegemony (paradigm) of networked digital reality: classless virtual space; own tastes (signified by Bourdieu), values and morals system, not involving monetary capital, but information cultural capital; the "new intellectuals" born out of Internet "habitus", establishing themselves through skills, abilities and effort inside the virtual environment; use of hi-tech equipment previously reserved to and class-sustaining for bourgeoisie.

Chomsky criticizes contemporary media with introduction of five filters: ownership, funding, sourcing, flak, ideology. Schiller and Lovink further criticize online polyphony of active audience as confusing cacophony of confused impotent audience. Online blogging journalism, social networks coordinated events, political and cultural discussions on forums, hacktivism, pseudonymity and the new values system negate the issues of ownership (free), funding (inexpensive or free), sourcing (more diverse), flak (pseudonym as security, safety in numbers), ideology attack (online always contained multiple ideologies flourishing through lack of censorship and higher anonymity).

Conclusion

The article in a very compressed form confirms and describes the paradigmatic shift, highlighting its advantages, providing references to its conglomerate synthetic nature including beneficial elements of earlier paradigms dating as far back as antiquity, yet forming its own distinct and unique system of values, classes and tastes, made possible with the aid of digital technology and networking. Although this paradigm is growing in parallel with global corporate capitalist framework, it bears sufficient distinct features to be seen as a complete society-based hegemonic structure undermining the evolving invasive preceding global hegemony through passive rejection and active substitution of its incentives and values, while making use of its technological advances.

References and Notes:

1. *Phil Graham, Hypercapitalism: New Media, Language, and Social Perceptions of Value, (New York: Peter Lang Publishing, 2005).*
2. *Alan Kirby, Digimodernism: How New Technologies Dismantle the Postmodern and Reconfigure Our Culture, (London: Continuum, 2009).*
3. *Esrher Dyson, George Gilder, George Keyworth and Alvin Toffler, "Cyberspace and the American Dream: A Magna Carta for the Knowledge Age," in Future Insight 1, no. 2 (1994).*
4. *Betsy Sparrow, Jenny Liu and Daniel M. Wegner, "Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips," in Science Express 7 no. 14 (2011): 776-778.*
5. *Alvin Toffler, The Third Wave (New York: Morrow, 1980).*
6. *Paul S. Piper, "Better Read That Again: Web Hoaxes and Misinformation," in Searcher 8, no. 8 (2000), http://www.infotoday.com/searcher/sep00/piper.htm (accessed 8 31, 2011).*
7. *Paul McFedrie, "prosumer," Word Spy's Web Site, October 24, 2002, http://www.wordspy.com/words/prosumer.asp (accessed 8 31, 2011).*
8. *Christian Jarrett, "Has the Internet Become an External Hard Drive for the Brain?" Research Digest's Blog, July 14, 2011. http://bps-research-digest.blogspot.com/2011/07/has-internet-become-external-hard-drive.html (accessed 8 31, 2011).*
9. *Marshall McLuhan and Nevitt Barrington, Take Today: The Executive as Dropout (New York: Harcourt Brace, 1972).*

DATA TRASH

Melinda Rackham

Data Trash traces the texture and tactility of HTML - looking critically at the evolution of the online inter-face and its appropriation back into object based artefact; clarifying the pivotal place of the network in our cultural realm.

Stella Brennan, Tuesday, 3 July 2001, 10:38am, 2001-2002, detail- cotton on canvas.

Does HTML leave a trace of tactility and texture?

Net art first appeared in a geeky corner, a few degrees removed from existing curatorial and museum practices. When Marc Andresson's *Netscape Web Browser* was introduced in 1994, it opened up new frontier of immersive, intimate public space unmediated by the art museum. On the net artists believed that they could work without context or censorship, retaining control of their content while constantly connected to a global community.

The net seemed like an intimate affair - a rich tapestry of connections. There was an element of forging a new craft. Stella Brennan has captured needlepoint, created in cotton on canvas, [Figure1] the Apple Macintosh operating system at the turn of the twenty first century – a view we no longer see as the landscape has radically changed. The approximately one meter square *Tuesday, 3 July 2001, 10:38am,* simply depicts a screenshot of Brennan's desktop, encapsulating an era.

The best networked art often relied on non-standard software and hardware, on glitches and on happy accidents to function. It was built with dynamism, rather than preservation in mind. We've already lost many fleeting works from the early experimental days of Internet art through corruption and mutation. Net art archives usually retain a minority of works – ones which are straightforward to conserve because of their common and stable formats, or their ability to be easily migrated. . With the certainty of either going out with a crash or slowly fading away, online art becomes data trash.

Ironically material culture responded to these issues with a mutant field of migratory practice with artists producing static artefacts from the ephemeral net.art works almost as soon as the works appeared! The wonderfully whimsical *Introduction to net.art (1994-1999)* a manifesto formulated by Natalie Bookchin (USA) & Alexie Shulgin (USSR), carved on six marble tablets by Blank & Jeron (Germany). The representation is derived from the Blank & Jerons work *Dump your Trash* (1998), where a software agent recycles existing web pages into new pages. Pages filed at this site stay stored even after the original has been long lost or shut down. The texts carved in stone secure their presence in the physical world while simultaneously subverting the ephemeral - an ironic commentary on the way we deal with data in the information society.

The memorial concept is taken further with Nick Crowe's *The New* Medium (1999) – fifteen glass panels hand-engraved with internet memorial pages that had been submitted to a web site called Virtual Heaven. First shown at the long defunct Lux Gallery, London in January 2000, *The New Medium* examined different forms of internet use including the iconography of personal homepages and the growing use of cyberspace as a spiritual medium. The fragile works glow faintly in the gallery full of sentiment and touching naïvety.

Investigating the point where the mind starts to confuse what is reality and what is illusion, Jan Robert Leegte focuses on the physical experience of the internet. His *Scrollbars (2005)* installation isolates elements of the Windows interface, which are projected onto various structures. As an artist he moved form being internet-based, to creating physical installations to develop a more meditative relationship between the audience and the work. Pixel depth is perhaps too superficial?

Carving in stone or painting on canvas secures a presence in the physical space of an object-driven art-market. The Google browser is surely the most painted, sketched, photographed and built interface artefacts, with Japanese artist collective Exenemo's 3.5x 2.5 m *Google* (2004) painting being one outstanding example. It is of course owned by the Google collection.

The *Rhizome* screenshot, drawn on paper with pencil and gouache (2000) by Russian Masha Moriskina, was as well, immediately bought by art portal Rhizome. Moriskina continued to create highly desirable web page renders – important g historical documents which reminding us of the long forgotten stories of Internet art victories such as that of the eToys/Etoy wars! [1]

It was never an easy fit as existing art forms such as drawing, photography, poetry, video, animation and radio moved to the net, adopting the unique aesthetic of chunky pixelated low res images, low bit sound, and the now vaguely recalled rhythm of slowly downloaded net-art. Networked art challenged but never usurped the well-established commodity value of the discrete art object and the primacy of authorship.

In 2003 Thomson and Craighead created the *dot-store* - an e-shop environment which delivered a series of artworks both on and offline. This included "a beautifully crafted set of four tea towels sporting a series of authentic search engine results returned to a user when the criteria, 'Please Help Me', 'Is Anybody there?', 'Please listen to me' and, 'Can you hear me?' were entered into the search field, while using Google in Netscape 4.7 on Mac OS 9.2 or Netscape 6 on Windows 98." [2]

The printed textiles, embroidery, drawings, engraving, sculptures, paintings, machinima and etchings have a ready-made future while the ephemeral coded works they are derived from do not.   To break

the glass, to trash the art, to rip the fabric is to scatter the bleached bones of HTML – the skeletal remains of the lively richness that once connected people across networks.

As we speed into that future, there is a certainty of corruption and mutation and decay. Online work becomes disposable data trash, environmental and cultural wreckage, littering the web with dysfunctional and lost artworks. But remember today's data trash will resurface, be revalued and recycled in a not too distant future.

References and Notes:

1. Jill Priluck, "Etoy: 'This Means War,'" Wired's official Web Site, December 21, 1999, http://www.wired.com/techbiz/media/news/1999/12/33189 (accessed June 7, 2012).
2. Thomson and Craighead, "Google Tea Towels," UCL's official Web Site, http://www.ucl.ac.uk/slade/slide/docs/towels.html (accessed June 7, 2012).

TERRA VIRTUALIS: THEY ARE REALITY

Melinda Rackham

Terra Virtualis, an exhibition of virtual art curated by the Australian Centre for Virtual Art (ACVA). It positions Australia as apart from, yet intimately cojoined to the rest of the world and is critically driven by the relationship of physical location in virtuality and augmented reality, to the expanded concept of site-specificity.

Rainbow X Apocalypse, Video Installation, 2011, Anita Fontaine & Geoffrey Lillemon.

They are reality. (1)

A red taxi snakes through an unexpected patch of greenery, swimming against the mid-evening, mid-level traffic up to the sanctuary of the Church of All Saints. My semi-permeable skin registers the shifting levels of moisture in the air ascending the Peak, as warm and cool oceanic currents. Satellite imagery and subjective back-stories of my destination scroll across the luminous tablet purring, fan humming and drive vibrating almost imperceptibly, on my lap. Outside black soil erupts from between concrete superstructures, teasing my nostrils with tropical fecundity as we pass.

Taxi morphs into a Fastback of undulating pattern; golden palm trees sway in the virtual breeze. You and I embrace like we have never before - exposed to our core. Anita Fontaine & Geoffrey Lillemon's *Rainbow X Apocalypse*, engulfs me. Beautifully. If 2012 is the final year of human existence I want to live fast and die young so my soul can be avatar for ever after in the *Metaverse*. [2]

Architectural scale generates minuteness and magnificence. Insignificant human creatures scurry below acres of highway flyovers, disappearing into transit tubes beneath ground. Life is cheap below the million dollar video displays atop the scraper canopy. Silhouetted by flickering neon, each tower competes for air space, every level presents a bigger, brighter, blinding surface animation. Our 21st century mega polis recalls with fond nostalgia its *Blade Runner* past while seductive faceting distracts our attention from the present realities of our *Diamond Age.* [3]

The ecosystem of *The Institute For Advanced Augmentiform Development and Release*exists in parallel to several others. It nurtures live interactions and data exchange. Virtual and the augmented realities dynamically link as Andrew Burrell & Warren Armstrong make us, the inhabitants of one world, responsible for the survival of the others.

She must suspect.
She senses her being.
Her memory is situated.

Women will notice it first. The virtual, like Irigaray's autoerotic female genitalia, [4] is not one. We touch ourselves constantly and the virtual is simultaneous. *Écriture feminine* [5] is perhaps the best way to speak on the subject of the virtual, for here knowledge and memory are foreigners. To know the virtual we must be immersed – to give ourselves over to being within soft, wet, hard space. Our pliable data bodies surrender to touch and meld with the unknown. We must have courage to play in the *Terra Virtualis* - territories of unknowingness. For it is when we try to feel, to know, to recall, to rename, to remember, that we do not experience what is. [6]

Meandering is that. Aroha Groves takes us seemingly randomly through her worlds. Her grand design, a connected thread of ideas, emotions, environs, and forms of consciousness will touch us, touch ourselves, and touch our soul.

Contemporary art will be virtual, or it will not be. [7]

The virtual is beyond photographic. The image is not recalled; rather we re-sense the intensities of experience. Virtuality, vitality, virtuosity is embedded and distributed like a rash of scarlett fever under my skin. There is no event, no horizon to orient my self against. [8] Trueness or falseness is not in contention here. Software parses the next scenic level. We do not lack vision in our rendered reality; we do not need optical illusion – frustration only arises from lack of control. The cartographies of the virtual have moved off the grid and beyond of the Street that runs the entire 216 km circumference of the perfectly spherical *Metaverse*.

The urban space shifts. *Neomaflux.* Augmented Reality resets perception. Troy Innocent and Indae Hwang construct urban space as it should be – a network of connected relationships. AR markers generate spatial digital language and abstract mindspace as mediated ISEA delegates consider the collective intelligence of the space itself.

Our experience of the intensity of virtual art is a moment of pure potential pleasure. This interstitial art, the art that happens when we are not quiet conscious, generates a moment of ambiguity and a mo-

ment of discomfort. But we must resist reaching backwards - grappling for the ease and comfort of re-call. This moment of being in the new territories is a moment of reality, of being within the flow of our bodily sensation. Let go and drift curiously into *Terra Virtualis*- into the crevice of unknowing.

We are not one - we are virtuality.

Melinda Rackham, Hong Kong and Istanbul, September 2011.

References and Notes:

1. *Adam Nash, Justin Clemens and Christopher Dodds, "The Manifesto of Virtual Art / Statement 4," Australian Centre of Virtual Arts's official Web Site, March 2010, http://www.acva.net.au/publications/ACVA_Manifesto_of_Virtual_Art.pdf (accessed June 7, 2012).*
2. *The Metaverse is a phrase coined by Neal Stephenson in his novel Snow Crash (1992) as a vision of how a virtual reality based Internet might evolve in the near future.*
3. *The Diamond Age: Or, A Young Lady's Illustrated Primer (1995) is a postcyberpunk novel by Neal Stephenson set in a future Pan-Asian metropolis of Shanghai in which embedded virtuality and nanotechnology affect all aspects of life.*
4. *In This Sex Which Is Not One (1977), Luce Irigaray reconsiders female sexuality in Western philo-sophical discourse and psychoanalytic theory, articulating the significance of the difference be-tween male and female sex organs and the experience of erotic pleasure in men and women.*
5. *Écriture feminine is the inscription of the female body and female difference in language, text, and context. It is a form of French feminist literary theory originating in the early 1970s that in-cluded theorists such as Hélène Cixous, Monique Wittig, Luce Irigaray and Julia Kristeva.*
6. *In "Feeling, Emotion, Affect," in M/C Journal 8, no. 6 (2005), Eric Shouse clarifies Brian Massumi's discourse on affect - "A feeling is a sensation that has been checked against previous experiences and labeled. It is personal and biographical because every person has a distinct set of previous sensations from which to draw when interpreting and labeling their feelings."*
7. *Adam Nash, Justin Clemens and Christopher Dodds, "The Manifesto of Virtual Art / Statement 11," Australian Centre of Virtual Arts's official Web Site, March 2010, http://www.acva.net.au/publications/ACVA_Manifesto_of_Virtual_Art.pdf (accessed June 7, 2012).*
8. *I speak extensively of immersion in the native code of the virtual in "Safety of Skin," in re:skin, eds. Mary Flanagan and Austin Booth (Cambridge, MA: The MIT Press, 2007).*

TRACING THE CITY: EXPLORING THE PRIVATE EXPERIENCE OF PUBLIC ART THROUGH ART AND ANTHROPOLOGY

Martha Radice, Kim Morgan & Solomon Nagler

What happens when the private experience of art is disrupted or reframed by the chance encounters and events of urban public life? Conversely, what happens when modes of production of art are opened up for the public to intervene in artistic creation? We draw on Lefebvre's sociospatial theories to present the framework for our interdisciplinary research-creation project, and use it to interpret an art installation on a public city bus route.

Fig. 1. Time Transit, 2006, Kim Morgan (artist), Craig Gelowitz (engineer), TRLabs Regina, mobile media art installation on Regina city bus route #4. © Kim Morgan.

Fig. 2. Time Transit, 2006, Kim Morgan (artist), Craig Gelowitz (engineer), TRLabs Regina, camera page from website (http://timetransit.com/). © Kim Morgan.

Whatever its form and setting, contemporary art tends to privilege a one-on-one relation between the viewer and the art. In the gallery, people encounter artworks within the bubble of their own personal space. In the cinema, they watch films ensconced in the dark, in a comfortable chair. People feel emotional reactions to art within their own bodies and express them to only a small circle of companions. Their experience of art takes place in a social context, but is typically privately contained. This paper – written by an urban anthropologist, a multi-media installation artist and a film-maker, respectively – presents the premises of an interdisciplinary research-creation project that questions this one-to-one relationship. We posit that the public space of the city can challenge – and indeed can creatively be made to intervene in – the private space of engagement with art. We ask, what happens when the private experience of art is disrupted, unsettled or reframed by the chance encounters and events of urban public life and space? Conversely, what happens when modes of production of art are opened up so that the public can intervene in processes of creation?

In our individual practice, we are each driven by a concern to investigate the sociospatial dialectic: the idea that the organization of society is necessarily expressed in and constituted by the organization of

space, such that transformations in the one effect change in the other. Our collaborative project explores the urban sociospatial dialectic through a combination of creative processes in the visual and media arts, principally film and site-specific installations, and empirical qualitative research in the social sciences. [1]

The sociospatial dialectic and new media art

We draw on Henri Lefebvre's conceptual triad of the social production of space to theorize our work. [2] *Spatial practice,* or *perceived* space, consists of people's perceptions of society through space that arise in their ordinary activities and routines, and the material settings and objects involved in these – the commute to work and the bus, the weekend movie and the cinema, grocery shopping and the supermarket. *Representational space* is the realm of symbols and images, also called *lived* space, because spatial symbols can be 'lived,' non-verbal, ineffable or clandestine rather than explicitly articulated. Here, space can be invented and imagined, and critiques of society and culture are possible. The visual, rhetorical and performing artists, the chefs and the artisans, the urban shamans, priests and diviners work in this kind of space, adumbrating the meanings that attach us to cities. In contrast, *representations of space* are consciously codified by those who have the power to shape and define society, such as urban planners, technocrats and scientists. Also called *conceived* space, this is the view from above; representations of space contribute the kind of knowledge that makes the city immediately or potentially knowable, productive and 'useful'. For instance, an anthropologist makes representations of space in order to understand it more accurately. Of course, anthropological research also involves observing and invoking spatialized routines and symbols. Each kind of space cannot be fully understood in isolation from the others, but together they refract the nebulous concept of 'space' in useful ways.

The sociospatial dialectic has evolved in ways that Lefebvre could not have foreseen, thanks to new information and communications technologies (ICTs) that collapse time and distance: cellphones, GPS, social media, GIS, and Web 2.0 protocols, which allow us to track and construct complex representations of geographical and social data. This spread of virtual space and its intersection with the material alter our conceptions of what 'space' really is, challenging "three deeply embedded assumptions [...]. First, that space is three-dimensional and shared between actors. Second, space is either solid or void. And third, you can only be in one place at one time." [3]

The collapse of the virtual and the material also blurs boundaries between public space and private space. In urban anthropology, the distinction between public and private space is not based on ownership or function, but accessibility and visibility. Space is public when it brings strangers from all walks of life into view of and into contact with each other, as individuals and groups. [4] Private space, in contrast, implies invisibility and interaction with an already known, even intimate circle of friends and family. New ICTs bring the private realm into public space – as you hold an intimate telephone conversation with your sibling on the bus – and the public sphere into private space – as you post comments on a newspaper website in the comfort of your living room. What results is an expanded idea of presence in space, and a sort of open border between intangible and material space.

This open border has been extensively explored by artists. However, we have two criticisms of many of the artworks that we have reviewed so far. Firstly, artists often incorporate locative media technology in ways that shrink public space into the personal world of the cellphone or computer screen. For instance, dialling a number posted on a wall or even, thanks to GPS, simply approaching a site with a cellphone can deliver a lyrical representation of that location through the phone to the listener, but it's for that

listener's ears and eyes only. Our second criticism relates to public participation. The new layers of the sociospatial dialectic seem to have integrated seamlessly into our everyday lives, and yet this very seamlessness conceals the authoritarian nature of the media. GPS and GIS were developed primarily as tools for making representations of space (conceived space), to better survey, know and control territories and their inhabitants. Interactive art projects – representational spaces – make earnest attempts to use ICTs to place authorship in the hands of the users. However, they often retain a hierarchical relationship between the artists and the public participants by selecting and therefore censoring interactive content according to non-transparent protocols, even when there is no technical requirement to do so.

Time Transit

In contrast, we aim to build on work that uses ICTs to broadcast over a wide swathe of the city and to decentralize authorship. One such example is co-author Morgan's *Time Transit,* a temporary mobile art installation that combined art, engineering, public transit and digital media in order to explore the impact of ubiquitous technology on our daily lives, and its potential to generate both interconnection and alienation in urban public space. [5] The installation site was the City of Regina Transit bus route #4 (Walsh Acres/University), a route which, significantly, traverses neighbourhoods that vary greatly in class and culture, from the university through to the impoverished north central ('the hood') to wealthy new suburbs. The installation had three principal interactive public components: an operating city bus; six major bus stops along the route equipped with cameras that constantly filmed them; and a website with text messaging and email (http://timetransit.com/).

The bus was fitted with a GPS system, four flat-screen monitors, a computer and a wireless network connection. Two monitors were mounted near the front of the bus and two near the middle of the bus. Each set of two monitors displayed the same content, which meant all the riders could experience the installation more or less equally as they rode the bus (Figure 1). The monitors displayed images captured from the cameras that were focused on the six major bus stops along route #4. The right-hand screens showedreal-time images of the next filmed bus stop along the route (i.e. where the bus was going). The left-hand monitors displayed images from the most recent major bus stop, and these images were translucent stills layered on top of each other, to represent the cumulative, collective memory of gestures and activities from where the bus had been. The passengers were thus able to view what had happened at the last stop and what was happening at the next stop on the screens. The website (Figure 2) showed the real-time location of the bus as well as film from the bus stop cameras. More importantly, it allowed users to communicate with the bus by typing a text message into a sidebar textbox, which would be displayed as scrolling text on the monitors of the bus. The message could either be displayed in real time or be dropped at a particular zone along the route, in which case it would show as soon as the bus reached that location. In addition, people could send messages to the bus via cellphone text message or email. A display hierarchy was set up to give these latter messages priority over ones from the website.

Time Transit made plain the ways in which ICTs fold time and space in on each other. Firstly, the installation existed in virtual and real space simultaneously. People could experience it by riding the bus, by appearing at the bus stops that were monitored by cameras or by browsing the website where they could either view or interact with the installation in real time. Secondly, *Time Transit* cumulated past, present and future: riders could see where they had been and where they were going. They could watch themselves board the bus or see friends waiting for them at their destination. Thirdly, *Time Transit*played

with conditions of surveillance and anonymity. Using their private cellphones, riders could send messages to unknown others that would be displayed publicly on the bus screens. Website users submitted messages to known passengers: "Larry bring home milk." The installation thus permitted privacy and even intimacy to dwell in the very public space of the bus. As one art critic wrote, "*[Time Transit]* not only prompts up to consider the city and its citizens but prompts subtle shifts in our understanding of how we occupy and experience the city and how we shape it – and it shapes us." [6]

While *Time Transit* pointed to the ubiquity of surveillance technology and its effect on our perceptions of private and public space,[7] it also challenged our paranoia about such issues. Here the users controlled the content and data collected by the equipment. They could appear before, perform for or hide from the cameras, remotely operate them, watch and be seen on-screen. They could publish their own stories and read those of other passengers – tales of their day or experiences of the public transportation system, shout-outs to friends or cheers for local sports teams. Regulars posted stories as serials, in daily instalments. Poetry often scrolled across the bus monitor screens... and so did profanity. Following a series of pointed insults, and at the request of the bus company, the project engineers added filters to censor profanities, but riders could also put their considerable creativity to work in finding ways to curse without using the forbidden words, circumventing authorial regulations. In this way, members of the publiccontributed to the installation not only by precipitating the activity (using the bus, viewing the screens), but also by creating its content.

To use Lefebvre's terms, *Time Transit* used conceived space – surveillance technologies and new ICTs – to create a lived space – an art installation – by means of perceived space – the everyday bus journey. The representational space had the unexpected side-effect of creating a new practical representation of space, in that this interdisciplinary artistic inquiry led the project engineers to develop an open-source application to track the real-time location of buses in city transit systems. *Time Transit* will acquire another layer of conceived space when we use urban anthropological research methods to analyze and interpret the text messages that were collected over the life of the installation. What kinds of content did the installation prompt users to create? How did it vary over time? What were the recurrent or one-off themes and modes of communication?

Tracing the City through Art and Anthropology

Our *Tracing the City* project will similarly create and trace public, interactive art installations through new avenues of anthropological and artistic inquiry. We aim to use locative media (GPS and GIS), cellphones and Web 2.0 interfaces to engage 'the public' – understood as people *and* places/spaces – in artistic creation. By layering dynamic data over physical space – for example, an architectural plane – we will create an augmented spatial environment that then becomes a tangible interface for the public, who collaborate to create the ultimate meaning of the work. The resulting artworks will be exhibited (installed, projected) in outdoor and indoor public spaces, becoming part of the sensory experience of the city, and will also have a virtual presence on the web. The project therefore engages with 'the public' in terms of both space and society. One site we are particularly interested in is Halifax's downtown public library, not only because it is a quintessential urban public space, but also because, like Regina's bus #4, it already has a public membership, a set of regulars, and is well integrated into spatial practice.

The anthropological component of the project consists of building in feedback loops that will both investigate how members of the public experience our artworks, and generate material for creating subse-

quent artworks. The research-creation process will be enriched by the contributions of three collaborators whose practices are connected to our own: Ellen Moffat, a sound installation artist based in Saskatoon; Christopher Kaltenbach, an interdisciplinary designer based in Halifax (NSCAD University) and Tokyo; and Erin Wunker, a cross-genre literary scholar at Dalhousie University. We are keen to find out how both the interdisciplinary collaboration among the research team and the interactive collaboration of the public will affect the structure and content of the artwork.

To come full circle back to Lefebvre, we will be engaging perceived, lived and conceived space in particular ways. We want not only to emphasize but to amplify the interdependence of imaginative space and everyday space: we want to bring spatial practice (perceived space) into representational spaces (lived space), making quotidian, routine experiences of the city alter and interfere with its resonant artistic symbols. This means bringing the banal events and objects of urban public space, both routine and haphazard, into the imaginative but typically personal world of art and culture. Moreover, by doing interdisciplinary 'research-creation', we want to draw on representations of space to make representational spaces – and, indeed, vice versa. Dialogue between artists and social scientists should enable the latter to creatively explore the conduct and consequences of arts-based inquiry, and the former to conduct rigorous research, particularly with respect to public interaction with and experience of their works. We recognize the paradox of, on the one hand, working to subvert and decentralize creative authorship, and on the other, turning creative processes into 'objects of study' and 'sources of data' that potentially nourish the commodification of urban symbols. But however codified and commodified they may be, representations of space still provide the knowledge that underpins our understanding of spatial practices and representational spaces. We take the opportunity of interdisciplinary collaboration to try working in the interstices between perceived space, lived space and conceived space. In these ways, we aim to make the public space of the city creatively intervene in the private space of engagement with art.

References and Notes:

1. Tracing the City: Interventions of Art in Public Space is funded by the Social Sciences and Humanities Research Council of Canada, Research-Creation in the Fine Arts award no. 848-2010-0019.
2. Henri Lefebvre, The Social Production of Space, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991).
3. Mike Crang, "Urban Morphology and the Shaping of the Transmissable City," in City: Analysis of Urban Trends, Culture, Theory, Policy, Action 4, no. 3 (2000): 303-15.
4. See e.g. Lyn H Lofland, The Public Realm: Exploring the City's Quintessential Social Territory (Hawthorne, NY: Aldine de Gruyter, 1998); Sophie Watson, City Publics: The (Dis)Enchantments of Urban Encounters (London: Routledge, 2006).
5. The Time Transit Project Team were: Kim Morgan (Artist in Residence, TRLabs Regina); Craig Gelowitz (Research Engineer, TRLabs Regina, University of Regina); Bill Friedrich (Computer Programmer, Co-op Student SaskTel, U Regina); Lee Henderson (Media Artist, Research Associate); Jane Uttaranakorn (Graphic Designer, Graduate Student, U Regina); and Laura Wiley (Student Engineer, U Regina).
6. Kim Morgan, "Artist Remaps City in New Ways," Leaser Post (Regina), November 29, 2006, http://www.canada.com/reginaleaderpost/news/arts_life/story.html?id=19e2dcd6-a7c6-4caf-9704-1ad2ecd65135 (accessed June 7, 2012).
7. See Lev Manovich, The Language of New Media (Cambridge, MA: MIT Press, 2002).

DIGITAL ANTHROPOPHAGY AND THE ANTHROPOPHAGIC RE-MANIFESTO FOR THE DIGITAL AGE

Vanessa Ramos-Velasquez

A theoretical essay proposing a new practice of consumption (ingestion, digestion, excretion) involving a technological mediation, and a manifesto-poem with a new take on the 1928 *Manifesto Antropófago* by Brazilian author Oswald de Andrade. I offer an update for the concept of cultural cannibalism in regard to the digital age, where the virtual world is the new frontier, and everyone a possible colonizer.
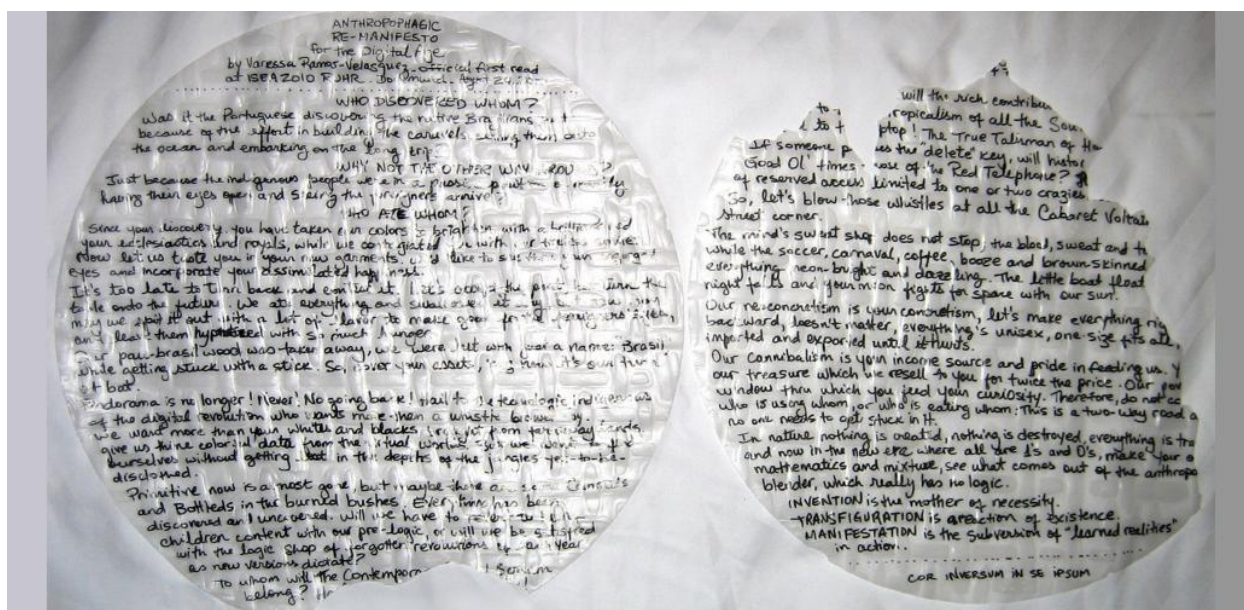
Fig 1. The Anthropophagic Re-Manifesto for the Digital Age
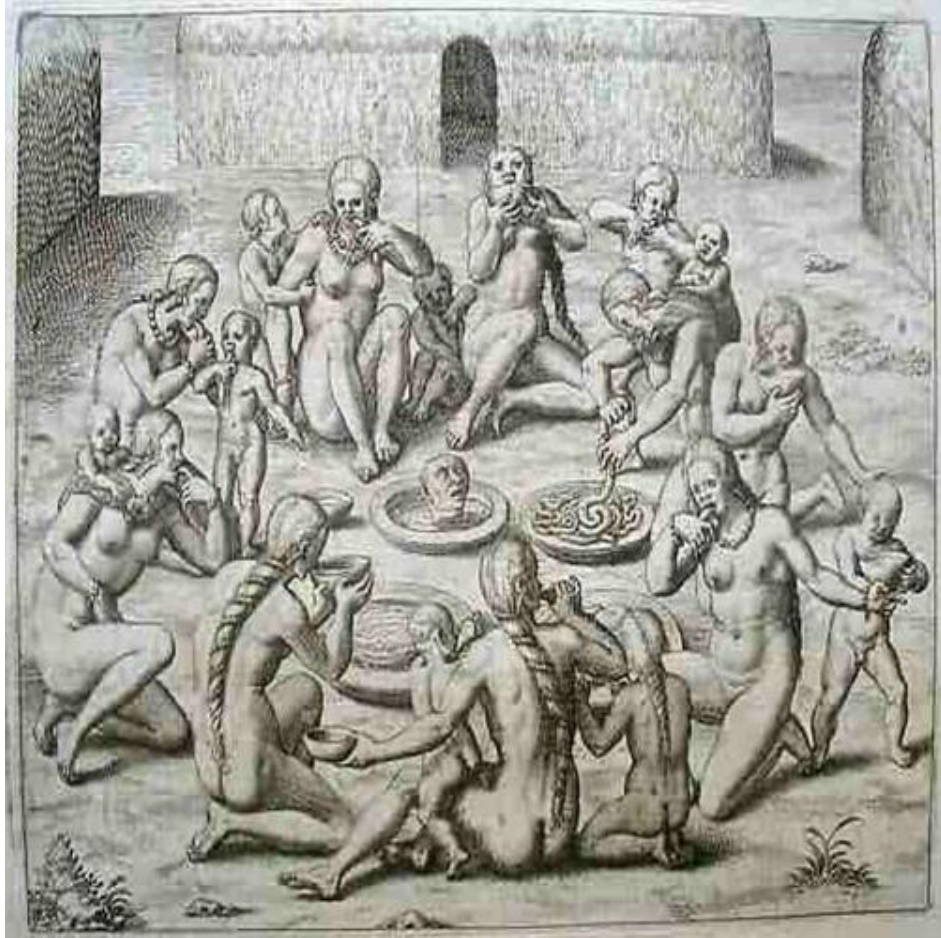
Fig 2. Anthropophagy

Fig 3. Digital Anthropophagy

ANTHROPOPHAGIC RE-MANIFESTO FOR THE DIGITAL AGE

Who discovered whom?

Was it the Portuguese discovering the native Brazilians just because of the effort in building the caravels, setting them onto the ocean and embarking on the long trip?

Why not the other way around?

Just because the indigenous people were in a passive position of merely having their eyes open and seeing the foreigners arrive?

Who ate whom?

Since your discovery, you have taken our colors to brighten with a brilliant red your ecclesiastics and royals, while we contagiated you with our tireless smiles. Now let us taste you in your new garments. We'd like to see thru your engorged eyes and incorporate your assimilated happiness.

It's too late to turn back and contest it. Let's accept the past, but turn the table onto the future.

We ate everything and swallowed it dry, but now may we spit it out with a lot of flavor to make good for the foreigners' eyes and leave them hypnotized with so much hunger.

Our pau-brasil wood was taken away, we were left with just a name: "Brasil", while getting stuck with a stick. So, cover your assets, 'cuz now it's our turn at bat.

Pindorama is no longer! Never! No going back! Hail to the technologic indigenous of the digital revolution who wants more than a whistle blower toy.

We want more than your whites and blacks brought from far away lands, give us thine colorful data from the virtual worlds. But we want to find ourselves without getting lost in the depths of the jungles yet-to-be-dis-clothed.

Primitive now is almost gone, but maybe there are some Canneds and Bottleds in the burned bushes. Everything has been discovered and uncovered. Will we have to revert to being children content with our pre-logic, or will we be satisfied with the logic shop of forgotten revolutions of each year as new versions dictate?

To whom will The Contemporary Primal Scream belong?

Hail to innocence and purity! May they never lose themselves in the post-modern emptiness of the Matrix, the new belly button of the world!

Hail to the ignorance of the infant unknown to pixeland!

This time, what will the rich contribution of all mistakes be?

Hail to the En-Tropicalism of all the Souths.

Hail to the Laptop! The True Talisman of Happiness!

If someone presses the "delete" key, will history be erased? Good Ol' times those of the Red Telephone? It was just one button of reserved access limited to just one or two crazies. Now every loony has one!

So, let's blow those whistles at all the Cabaret Voltaires of every street corner.

The mind's sweatshop does not stop; the blood, sweat and tears run infinitum while the soccer, carnaval, coffee, booze, and brown-skinned beauties leave everything neon-bright and dazzling. The little boat floats at sunset as night falls and your moon fights for space with our sun.

Our neoconcretism is your concretism, let's make everything right, left, forward or backward, doesn't matter, everything's unisex, one-size fits all, made in China, imported and exported until it hurts.

Our cannibalism is your income source and pride in feeding us. Your trash is our treasure which we resell to you for twice the price. Our poverty is your window through which you feed your curiosity. Therefore, do not complain who is using whom, or who is eating whom. This is a two-way road and no one needs to get stuck in it.

In nature, nothing is created, nothing is destroyed, everything is transformed; and now in the new era where all are 1's and 0's, make your own mathematics and mixture, see what comes out of the anthropologic blender, which really has no logic.

Invention is the mother of necessity.

Transfiguration is a reaction of existence.

Manifestation is the subversion of "learned realities" in action.

FULL ABSTRACT

The background of my *Digital Anthropophagy* theory comes from the *fair use* conundrum of the Information Age. One of my own art practices is to create films from found footage and openly exposed media. I metabolize these materials into new contexts. In the creative process of this practice, in the age of the Internetworked Information Society as the producer of culture also engaged in remixing, offering a rich self-serving online buffet, I often thought of the Anthropophagic practices of some Brazilian indigenous tribes when they came into contact with their colonizers. The indigenous cannibal honorably eats the foreigner in order to incorporate his strength, experiences and qualities and to see through the cannibalized foreigner's eyes. But I find that in today's digital culture, we unceremoniously consume the world around us in a globalized structure, thus quickly acquiring worldly references and spitting them out in a personal but also somewhat homogenized way. We have thus become both the cannibal and the cannibalized because of the wide and immediate access to information and the incredible reduction

of time it now takes to consume that widely available culture. It no longer takes a passive person watching the ships arriving on the shore in order to consume what they might bring aboard, and conversely, for the colonizer in those ships to take away the riches they "discover" in far-away lands. Over five hundred years later, that exchange has now become cross-pollinated and more equal, and happening in an inhuman speed cycle. And the paradigm of power acquisition has now shifted from land ownership of colonies to ownership of information and creative property, especially engendered by the virtual world. This virtual world has started to disintegrate former imperialism and push toward a "democratization of access" and "freedom of use" of information. And so I offer an analysis of Information Metabolism which drives human experiences. I hope this work furthers the discussion on fair use of media, leading to a simplification of global fair use cultural models and practices in the age of digital culture.

Background history leading to my Anthropophagic Re-Manifesto for the Digital Age:

In 1928, a Brazilian Modernist author, Oswald de Andrade wrote the *Manifesto Antropófago*, (the *Cannibal Manifesto*). It was an assertion of the unique Brazilian voice in the emerging modern time, away from clichés of colonialism, while unapologetically metabolizing outside references from the First World. Over 100 years since Brazil's independence from Portugal, the moment of transformation had come! To devour outside artistic influences from Europe, and to finally incorporate all their developments useful to Brazilian culture, while seeking the Brazilian modern identity, strength and unique vision. It was as much a dictum against the colonizer's power, as it was a criticism of the colonized people's hunger for what is not their own. My manifesto-poem offers a new take on the original Manifesto and I call it a "Re-Manifesto", alluding not only to today's remix culture, but also to a re-assertion of previously colonized cultures into the new dynamics and context of cultural influence in the digital era. My *Digital Anthropophagy* position paper likewise, seeks to update that anthropophagic practice of cultural cannibalism to the digital age, proposing that the virtual world is the new frontier and anyone can be a colonizer.

In my Anthopophagic Re-Manifesto, I expose that the allure, the attraction of "the other" is mutual and that it serves to form a symbiotic relationship that feeds both peoples. The concept of "the exotic" is a two-way road, for if one has never seen the other before, their mutual discovery is of equal impact, and a curiosity to consume that newfound exoticism is occurring on both sides. The question thus is not about the symbiosis itself, but about the degree of positive influences and acculturation, especially in the era of an ongoing digital revolution. Of course the great line dividing this equality in colonial times was an economic one: the colonizer upon seeing a newfound land sees money, while the "found people" just sees unknown people. That very innocence of the Golden Age is the exotic raw material that so many in the First World seek, but beware as even in that innocence lies the cannibal spirit. And since there's no more land to discover, the colonizer has now become the entrepreneur who seeks to conquer the virtual landscape of 1's and 0's. But now the "innocent" is born with a much larger capacity to understand and dominate that virtual world. So now the entrepreneur is forced to invite who he or she sees as the cannibals into the game in order to keep the barbarians at the gate. And these little barbarians will grow up to be the entrepreneurs of tomorrow in an endless cycle of digital evolution. Thusly, anyone will be a colonizer, except this time nothing is done by imposition because the networked community functioning as a universal brain decides what gets served up, and consequently what becomes consumable in this natural entropic filtering process.

My Manifesto-Poem is therefore a new take on the original *Manifesto Antropófago*. It is but a glimpse through a prism reflecting how the indigenous Anthropophagic cannibalistic practice resonates to

today's civilized society, materializing as cannibalistic remix culture spanning the entire world in an age where virtually all colonies have proclaimed their independence. It's the new world order: anyone can chose to be either the colonizer or the colonized, and why not both?

DIGITAL ANTHROPOPHAGY

INTRODUCTION

"Anthropophagy": anthropos = "human being" + phagein = "to eat". Main definitions:

1. Cannibalism, as the eating of human flesh by a human or humans
2. Self-cannibalism, as the eating of one's own flesh
3. Eucharist, the ceremonial eating of the body of Jesus as wine and bread

In my view, these forms of cannibalism have transmutated into a new form, which I would like to propose as *Digital Anthropophagy*, meaning:

1. All the aforementioned Anthropophagic practices if done virtually, for example, with the aid of computers, social online networking, and other digital devices; or if executed in reality but facilitated digitally
2. A new paradigm of input/output models generated via the internet
3. A new practice of cultural consumption involving a technological mediation for input (both the feeding and the being fed), digestion, and output

OVERVIEW

Cultural Cannibalism from tribal origins to today's cultural practices through a mash-up of Biological, Philosophical, Social, Economic, and Artistic perspectives.

- DIGESTIVE PROCESS OF CANNIBALIZATION: ORIGINAL RECYCLERS and REMIXERS
- DIGESTIVE PROCESS OF CANNIBALIZATION IN HUMAN BEHAVIOR: ACTIVE AND REACTIVE AGENTS
- CULTURAL IMPERIALISM AND TECHNICAL BARBARISM LEAD TO A REACTION TO DEMOCRATIZE
- ACCULTURATION MODELS ACCORDING TO A PROPOSED POLYMORPHOUS CANNIBALIST PRACTICE

CHALLENGES

Human nature reacting to widespread availability of information and culture. Uncontrollable hunger to consume what's available and facility of "public as producer of culture" leading to uncontrollable media usage in the form of appropriation and re-appropriation, memes as an example.

- CYCLES OF CONSUMPTION / MEDIA BOMBARDMENT
- APPROPRIATION
- RE-APPROPRIATION
- THE NEW TECHNOCRACY
- THE NEW CANNIBALISM: TO PROPAGATE OUR HISTORY AND TO SECURE OUR IMMORTALITY

PROPOSED SOLUTIONS

Considerations for a free and democratic internetworked society.

In practical terms, common sense should guide us in helping to decriminalize the very pillars of freedom of expression and access to information as they are paramount in the new socio-economic develop-ment. In his book "Remix", Lawrence Lessig proposes five steps to help us walk the path towards more efficient and sound copyright law.

My own proposed methods involve:

- Credit your sources whenever possible! If you don't know who or where the material came from, use a standard disclaimer that invites the audience to contribute the missing information, much like in the Wikipedia model.
- Use a pre-existing international forum, such as Creative Commons to further internationalize the simpli-fication of copyright regulations into the Copyleft Model, and expand upon it to ensure owners of the creative property are getting paid in a fair method for the use of their work.
- If this model starts to fairly valuate the exchange of intellectual property, then Mafia-like organizations who collect money on behalf of artists will naturally become obsolete and disappear, just like in a process of natural selection and evolution.
- Treat other people's output as you would like yours to be treated, keeping in mind that imitation is still one of the highest forms of flattery, but that we have moved way past that simplistic form of content integration onto higher forms of remix culture and beyond, where everybody can win. New technologies will always bring with them new possibilities and probabilities that cannot be stopped or reversed. Therefore it is up to each of us to be creative in how not to lose profit but more importantly in how to gain new profit. And by profit I don't mean just money, but all that is made possible by being internet-worked. A new gateway to a new kind of enrichment.

References and Notes:

 -Winner of the Flusser Award Distinction (Vilém Flusser Theory Award) at Transmediale.11, the work premiered at ISEA2010/RUHR – International Symposium on Electronic Art: Cyborgs and Transhumans. After ISEA2011/Istanbul, next presentations in 2011 at Moscow Biennale - Pro&Contra Symposium: Media Activism; the International Congress Image, Imagination, Fantasy. Twenty years without Vilém Flusser; virtually from Berlin, Germany at ABCiber Conference in Brazil; and at Festival CulturaDigital.Br at Museum of Modern Art in Rio de Janeiro, Brazil.

-Initiated in May 2009 and completed in July 2010, in reality the work is morphing according to the interplay with the date and place where it's presented. And thus the work itself becomes Anthropophagic.

-This text is an abridged version fit to ISEA2011/Istanbul print format. For complete paper, video version, or if interested in publishing, or bringing this performative work to your programme please contact author.

-I am unfolding other forms of expression from my Re-Manifesto such as a film done via Facebook. The public is responding to the invitation by choosing phrases of my Re-Manifesto and self-recording reciting their lines and posting the clips on project page: http://www.facebook.com/pages/Re-Manifesto-Antropofagico-para-a-Era-Digital/174803579203744. The video will also exist as a finalized edited piece and spread virally online for unrestricted reuse by third parties, following the inherent concept in Digtal Anthropophagy. Please visit the Facebook link for more details on how to participate.

-More about the work on artist's websites:

- *www.quietrevolution.me*
- *coming soon: www.vanessaramosvelasquez.me*

 -ISEA2011/Istanbul presentation sponsored in part by Step Beyond Travel Grants Programme / European Cultural Foundation.

A POTENTIAL LANDSCAPE

Jonas Ranft

Landscapes... Beautiful landscapes, of course: mountain ridges and beaches. The sea and the desert as they constantly evolve, retract & gain territory, change their very appearance. Did you know that not only does a wild sea roar but that dunes can sing? Landscapes are dynamic, and we're part of it.
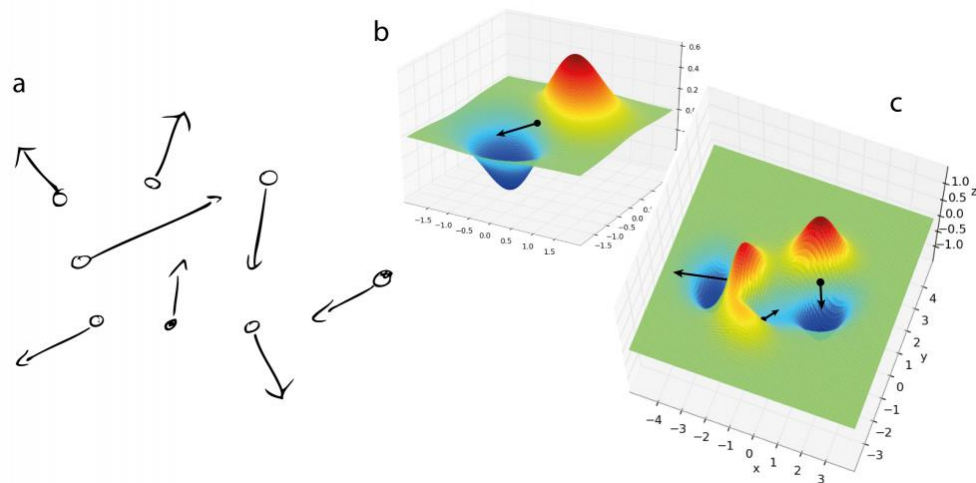
Fig. 1. (a) Sketch of agents that move on a plane, with speed and direction as indicated by the arrows; (b) the potential that corresponds to the motion of a single agent; and (c) the global potential landscape that accounts for the motion of all agents around.
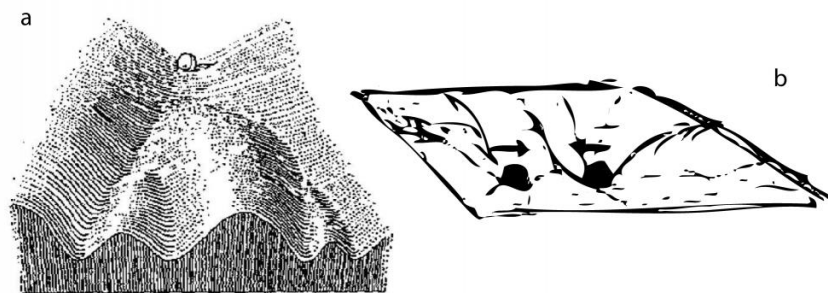
Fig. 2. (a) The epigenetic landscape as depicted by Waddington: The marble represents a cell that differentiates on its way down the valley, thereby experiencing constantly a new environment. (b) Sketch of two (actual) marbles on an elastic sheet which gets deformed, thus mediating an attractive interaction between the marbles.

```
def single_potential_2d( x, x0, v0 ):
    """potential around single agent

    calculates the potential such that the gradient
    at agent's position equals the agent's velocity
    (overdamped, friction coefficient is 1
    in dimensionless units)
```



```
    """
    a = dot(x-x0,v0)
    b = dot(x-x0,x-x0)
    c = - a * exp( -b/10. )
    return c

def find_rc( xi ):
    """determines the critical radii around multiple
    agents
    """
    na = len(xi)
    rc = zeros(na)
    for i in range(na):
        pos list = xi.tolist()
```

Fig. 3. The potential that corresponds to a given motion is combined of a skewed plane and a Gaussian cut-off, in order to remain localized around the agent.

Imagine you have a bird's eye view of a public square full of people. Some of them stand together chatting, one or two sit on a bench reading the newspaper. Others are moving around, crossing the square hastily as to catch the bus on the other side or just because they overheard their alarm clock this morning, being in a hurry all day since; some stroll around without any apparent destination, changing their mind once in a while and turning direction. What makes all those people move, what determines their pace? In the following, we hypothesize that these movements in space and their evolution in time can be understood as a dynamical system whose "inner workings" we aim to uncover.

Let's consider this dynamics from a more abstract perspective. Figure 1(a) shows a sketch of some 'agents' moving in a certain direction with a certain velocity, a simple representation of a given configuration of people on the public square mentioned above. We can now rephrase the above questions: How does such a configuration arise? How do these configurations evolve? Which forces act on the agents, confer momentum, make them go? Here, we unveil an underlying potential landscape that ac-

counts for these forces and thus explains the observed movements. This potential landscape can be considered as kind of a socio-dynamical analogue of potential energy in physics. Think of gravity: An apple that falls from the tree accelerates due to the gravitational force; this force results from a difference in potential energy between the apple being high up in the tree (more energy) and down low in the grass (less energy). Analogously, it is the ups and downs, or gradients, of the potential landscape that describe the varying forces that the agents experience in time and space.

So how does this potential look like? If it determines our behavior, can we feel it? Where 'is' it? These questions are difficult to answer. No, we can't feel it. No, it doesn't smell. The potential is invisible, of course – but it defines a landscape that we can represent.

Dynamics of the Unseen

First, consider an individual, a single agent. In order to extract the potential from the observed motion, we assume that (i) the velocity in amount and direction is given by the slope of the potential at the agent's position, and (ii) the potential forms a smooth surface without abrupt jumps or kinks. This is illustrated in Figure 1(b), which shows the potential around a single moving agent. Analogously, we can reconstruct the global potential for more than one moving agents in the very same way, where the slope at any agent's position corresponds to its velocity, see Figure 1(c). This potential landscape, however, is not static. Foremost, this is a matter of fact: We change our mind – and in the potential landscape picture this implies that the gradients change, hills and valleys move, too.

This is unheard-of: From the wills of the gods via Leibniz' pre-established harmony to voices in modern neuroscience – ideas that our actions are determined have been around. But the underlying dynamics has never been exposed so explicitly, as something that we can see with our own eyes.

Just watch it! The hills and valleys defining the potential landscape sweep across the square, and all the people can't but move accordingly. A little chitchat here: two people that meet on a flat spot. As the potential starts to bulk out, they inevitably separate, moving in two different directions, drawn apart. Then that lady over there: hurrying along as the steep potential gradient pushes her forward... It is a smooth, ever-changing landscape that we observe, almost reminding us of a heartbeat as it goes up and down here and there. Importantly, it is a social fabric: It is a single, joint potential landscape that determines everybody's pace.

There is another clue to it: Now that people can 'watch' the forces they are subject to, they may react. Trying to escape that determination. I'll prove my free will! Will I be able climb that hill? Defy the laws of motion? The potential seems to be one step ahead, however: In fact, it corresponds instantaneously to their supposedly free actions, and inevitably everybody continuously seems to follow the line of steepest descent. This states the ambiguity of our approach: In reconstructing "A Potential Landscape" *a posteriori* from the observed movement, it is the movement that precedes the potential –constructing it in a way that it accounts for the movement, it is the potential that causes the latter. What truly remains, is the constitution of a new social space: Even if it seems that we can't defy the laws of motion, we will soon realize that together we can create all kinds of patterns...

Fiction and Epigenetics

No pseudo-scientific vocabulary like 'force', 'potential gradient', and 'momentum' can betray the careful reader: the unveiled potential landscape is of course purely fictitious. Let's consider it as some kind of fiction, a story that is told, a game maybe. By taking it seriously, though, we might be able to learn something about dynamic landscapes in general. How can local dynamics be reconciled with the idea of a global, unified landscape? What kind of feedback can be conceived between a landscape and the dynamics of agents it might represent?

In the sciences, the landscape metaphor is recurrent: In biology for example, the epigenetic landscape provides a simple picture for epigenetic phenomena such as cell differentiation, serving as a means to explore by figurative analogy different aspects of the concept in question. In population genetics, the 'fitness landscape' – be it adaptive or not – describes the fitness of individuals with certain genetic traits; physicists speak about 'energy landscapes' when they refer to a system's potential energy as a function of space. It is the epigenetic landscape, introduced by Conrad Hal Waddington in 1940, which is the paradigmatic example of a dynamic landscape that evolves in time. [1] Waddington, a biologist, was interested in the apparent contradiction that stem cells can differentiate into different types of cells such as muscle cells and neurons for example, although every cell contains exactly the same genome which encodes the building plan for all the molecular constituents of a cell. Necessarily, it is not only the individual genome, but also the environment of that cell, that determines the so-called cell fate, i.e., which type of cell it will develop into. The epigenetic landscape, see Figure 2(a), describes this process of cell differentiation: As a cell starts 'at the top', it rolls down the hill, following a broad valley which is laid out by the genome. Later, the valley splits in two, and for the future differentiation it is important where exactly the cell reaches the branching point. However, this landscape is not static either, for two reasons: When a cell differentiates, it (i) changes its own gene expression pattern, and (ii) is most probably subject to an altered external environment, which is both reflected by a modification of the landscape. [2]

The potential landscape introduced above mimics that idea: The movement of the agents follows the slope of the potential, and as they move the potential evolves accordingly. Because the potential is calculated from the observed dynamics – "Tell me your velocity, and I tell you your potential" –, it is kind of a reverse engineering approach; only that the result is pure fiction. But if we do not insist on the "predicting" character of the potential, we can see it from a different angle: The derived landscape is dynamic with a time evolution that is determined from the of localized agents. As such, it is a complementary concept of landscape dynamics. On the one hand, it seems to be the opposite of the complexity of the epigenetic landscape, for which external driving and intrinsic dynamics of the landscape are in constant interplay. On the other hand, however, in the epigenetic landscape picture, a cell's course is not essential to the epigenetic landscape dynamics anymore: To the extent that the path of a cell follows the landscape, it is predictable from the landscape itself; to the extent that it is unpredictable, it is simply additional external input that has to be taken into account for the further time evolution. Whereas in the proposed potential landscape the landscape is nothing without the agents, the epigenetic landscape evolves and changes and adapts without necessarily including any cells at all in the picture.

Interaction

So what about the interaction between different agents? In order to answer questions like "How does A influence B and vice versa," I will have to elaborate more on the algorithm according to which the global, multi-agent potential landscape is constructed. Let's come back to the two necessary conditions

that qualify the extracted landscape as a (fictitious) potential of the observed movements of individuals. First, the velocity in amount and direction is given by the slope of the potential at the agent's position. Second, the potential should form a smooth surface without abrupt jumps or kinks and should not diverge at infinity. For a single agent, this is straightforward: We just combine a skewed plane of the right slope with a gaussian bell-like curve defining a cut-off, and we obtain a smooth function with the correct characteristics, see Figure 3. But how do we fulfill these requirements if more than one agent is present? If we simply added up the 'individual potentials' of two or more agents, the first condition would not hold anymore: We would obtain a smooth landscape, but with a slope different from the agents' respective velocities with which we started from. Somehow, we have to glue the individual potentials together in a way that the correspondence of slope and velocity is preserved. The motion of other agents' (B, C, ...) must not at all contribute to the local shape of the potential at the position of agent A.

This suggests that there is no interaction at all! This is true as far as the motions of the agents do not influence each other, which is intrinsic to the reverse engineering approach – otherwise the game could not be played, the agents' dynamics and the potential landscape would not be related in the stipulated manner. But as far as the dynamic of the landscape itself is concerned, the interaction can not be neglected: Whenever two agents are close to each other, the potential reflects this fact and changes its appearance! Whereas the people on a public square might not be coupled involuntarily by some real, hidden mental potential, they could well interact deliberately in response to each other. This is the social space referred to before: Once the proposed potential landscape is visualized in some way or other so that everybody involved can observe it, it opens up new perspectives on group dynamics and social behavior. It serves as a playground and catalyst for interactions that are not prescribed, but a response to the observed landscape dynamics.

This mode of interaction can be contrasted to actual, direct interaction, as for example between two marbles on an elastic tissue, see Figure 2(b). The weight of each marble deforms the tissue, which in turn guides the movement of the marbles towards each other. Such a system, however, is totally passive: Neither do the marbles choose a direction deliberately on their own, nor does the elastic tissue present additional forces that may drive the marbles apart. It would be worthwhile to construct an instance of a coupled system that tries to overcome such passivity, with a dynamic balance between active perturbation and passive response (see also [3] for experiments with "membrane landscapes").

The Potential Image

I want to dicuss "A Potential Landscape" from yet another perspective. This landscape is an image. The potential comes to life with its visualization, visual representation. In principle, this representation has to be three-dimensional, be present, re-present in real space. Leaving the technical implementation (and limitations) aside: What does this dynamic image of hills and basins tell us? First, we notice that spatial structure is intertwined with evolution in time – there are no stationary structures, the height modulation corresponds to a temporal dynamics. Then, we may decipher that there is a connection between the potential and underlying agents, their movement and the dynamics of the image. But what do the hills signal? Are they not indicative of some kind of a presence, telling the observer "Here is what you look for"? Analogously, what do the basins tell us? We find that they are essentially empty, void of meaning. The agents are localized at the points of inflection, where the slope stops to grow and starts to diminish. Whereas the maxima and minima of a curve are defined only with respect to an up and a down, the inflection points are intrinsic to a curve independent of a defined axis. This is why Bernard Cache, an architect-philosopher, calls these points "intrinsic singularities" and considers them as the

"primary image" - like an image atom - from which whole territories are derived. [4] I want to close with a quote from his book *Earth moves*, which captures the image aspect of "A Potential Landscape" re-markably well:

"Just a hill and a valley and nothing more allow for all possible becomings. Space is thus no longer a jux-taposition of basins but a surface of variable curvature. We will no longer say that time flows, but that time varies. No settling is possible in such a landscape: variable curvature turns as into nomads."

References and Notes:

1. *Conrad Hal Waddington, Organisers & Genes (Cambridge: Cambridge University Press, 1940).*
2. *In the absence of a microscopic theory of life and a quantitative understanding of all the involved processes and signaling pathways, the epigenetic landscape must remain a mental image. Still of today, however, the epigenetic landscape is a widespread metaphor in the biology community and featured on many introductory slides in talks about epigenetics. Whether it is still of concep-tual use, referred to for historical reasons only, or rather intellectual dead weight that is in the way of new, more precise concepts of epigenetics, I do not dare to speculate about.*
3. *Sara Franceschelli, "Dynamics of the Unseen," Proceedings of 12th International Generative Art Conference (GA2009), Milan, (December 2009).*
4. *Bernard Cache, Earth Moves: The Furnishing of Territories, trans. Anne Boyman (Cambridge, MA: The MIT Press, 1995).*
5. *A processing sketch illustrating the ideas and algorithms of this paper: "A Potential Landscape [v0.1]" which can be found at http://www.pks.mpg.de/~jranft/dynlan/potlan.html (accessed June 8, 2012).*

VISUALISING EMOTIONS AND AUTISM

Barbara Rauch

The e_Motion research proposal integrates 3D visualization, haptic technology and rapid prototyping as a window into the Autism Spectrum Disorders (ASD) mind. It represents an exciting evolution of past work done on emotion and digital media. Through the research of Simon Baron-Cohen and others we have learned that ASD falls along a broad spectrum.
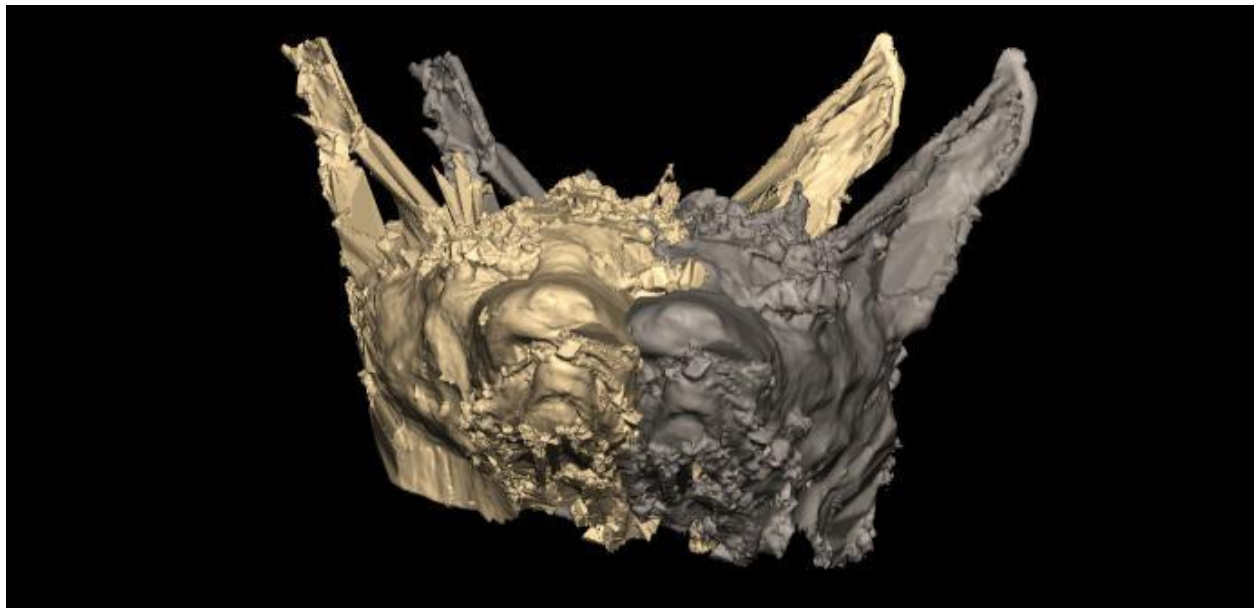
Preface
It is now well known that many ASD people are visual thinkers and learners, and this paper proposes new research to utilize state-of-the-art but 'APPROACHABLE' digital technologies that will allow the autistic person to speak with distinct and enhanced visual voices. This differs from art therapy in that it will lead to a better understanding of how ASD individuals think and feel, through visualization. That the products of creativity might allow psychologists and neuroscientists to better place individuals along the ASD spectrum is especially critical.

This research paper outlines a unique contribution emphasizing emotion and visualization through digital 3D production and haptic technologies. The project is still in its early stages of production, however it has initiated the outlines and hypothesis of a promising cross-disciplinary study that also introduces a PLAY method for emotion rehearsals.

Introduction: Engaging Autism at e_Motion Lab
The discussion of affective computing that Rosalind Picard introduced in the mid-1990s is rather interesting to me when it comes to machines learning about affect and emotions. If we claim that we are ready to produce synthetic emotions to build affect in robots, we seem to know a great deal about them. Here, I am concerned with finding out what happens if emotions go wrong. At 'e_Motion Research Lab' we work together and investigate with the autistic person, or more correctly the person on the Autism spectrum disorders (ASD) who serves as a case study for a malfunctioning of emotion handling. The autistic person's main goal is twofold: it is to learn to read and respond emotionally to signs of emotions and of equal importance to experience emotions in their full meaning. It has been questioned whether the autistic child can actually learn to experience true emotions. I am investigating in the floortime approach introduced in 'Engaging Autism', a book by Stan Greenspan, in which he delivers thorough research that helps autistic children to relate, communicate and think in a meaningful way. The work suggests that the psychology therapist has to examine the developmental stages of the very young child and go through the learning processes with the child (and parent) step by step. They initiate creative situations by employing a Play methodology. What I bring to this approach is the use of haptic and

tactile interfaces to generate and also measure emotional feedback and affective creation. I suggest that the haptic technological interface research might enhance emotional and affective experiences through the hands-on creation process.

Intersubjective Approaches to Influence Emotional Communication
How do we learn a language and/or social skills? We seem to build on personal experiences; we create a model of the world that is being constantly updated. However emotions are very subtle and the autistic person seems to be less tolerant of emotional responses that differ from the model they had just adopted. By this I mean to introduce the subtleties of facial or bodily gestures that communicate all shades of emotional correspondence.

The problem with emotions is that we need emotions to make creative choices but also emotions and feelings are necessary in order to make rational choices. Affective computing talks about this problem of affect and emotion not being the same: affect is central to our understanding of culture, in particular to the postmodern debate; the body and its capacity for sensation is informing cultural theory - its discussion about how society and humanity are far more complex, and cannot be reduced to a diagram. Picard (1996:1) defines affective computing as "computing that relates to, arises from, or influences emotions." (She coined the term in the mid-1990s.)

My earlier attempts to visualize emotions came into being when I worked on a study about facial expressions. I employed Paul Ekman's understanding of universal emotions, expressions of the face that can be understood across cultures. His classification of basic emotions into a list of six distinct emotions (anger, disgust, fear, happiness, sadness, and surprise) was later extended to include guilt, contempt, shame and others. I initially used a list of seven emotions by adding contempt to the original six basic expressions. This allowed me to select distinct facial expressions in the human face that are identified with being happy, sad, disgusted, afraid etc.

Through a previous collaboration with the University College London I had access to a large 3D database of the human face, where I suggested adding new scans, namely scans of a smiling, frowning, surprised or disgusted face of a man. Furthermore I was interested in discussing the evolutionary aspect of emotions, not unlike Darwin's interrogation of expressions of emotions in animal and man. I therefore included a fox's neural expression in the very same large database. This allowed me to morph not only from a happy to a sad person, but I could now also animate the face to become more fox-like, with a happy or sad expression on its face. This model will be used in a study to test facial expressions and mimicry in the autistic person.

Several research creations were produced using this large database. Works include 'emotional degrees' (animation), 'interFaced' (sculptures), and 'friends' (hybrid digital representations of merged faces). I will include images of these works. Copyright Barbara Rauch.

In his book 'Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life' Ekman (2003) describes the importance of the face in human communication. We all recognize a smile, we mimic it and so does the infant child.

The autistic child however might not return a smile, and it has been discussed whether this is due to the child not being able to read the emotion of the mother more generally, or if this is due to a frustration

caused by the child not being able to clearly identify or classify slightly different emotional expressions on the face.

The study of emotions in autistic people has been addressed by numerous researchers, and one particular theory is of importance to my research and this will be elaborated here. When discussing the issues of emotions in humans we relate concepts of consciousness, mind, empathy, and evolutionary biology, animal study and social neuroscience; all of the named concepts address the debate of an emotion theory and the theory of mind (ToM).

If a subject has an understanding of self and other, place and time, the person will be able to simulate a situation or even imagine someone's thoughts and intentions. And this is what seems to go wrong in the autistic child's mind. Theory of mind impairment sometimes referred to as mind-blindness discusses the inability of the autistic person to understand that another person has her own thoughts, this of course also includes feelings or emotions in response to particular incidents that the other person might experience.

Imitation, mentalizing and empathizing are skills that the young child acquires by mimicking and learning, however it seems that the autistic child might not have a very robust theory of mind (Baron-Cohen 1985). 'Theory of Mind' is what Baron-Cohen refers to as 'social reciprocity'. It is important as a social skill to pay not only attention to others, but also to others' intentions. The learning of other and self is usually mastered by a young child of 2 years of age. (See chapter 2, PhD thesis, Rauch 2006.)

The ability to imitate, mimic, mentalize etc., allows social-cognitive achievements, perspective taking, empathy: all these are the base for a theory of mind. The ASD child does not mimic the mother's gaze or smile, because it seems she cannot read exactly, as the face might vary too much for the ASD's liking of systematic answers and clarity in the expression. There is fascinating research on the interaction of the autistic child with robot toys that confirm this bold statement (Kaspar the friendly robot or soccer-playing humanoid robot Nao have both been developed for use treating autistic children).

Stanley I. Greenspan in 'Engaging Autism' (2006) points out how important early signs of autism in infancy are and in describing and advocating the floortime approach and the DIR program parents and therapists can intervene and help the autistic child to learn how to develop social skills. Greenspan reiterates how important it is to learn each step in the development. One has to be able to engage in basic attention, to be able to share a world to be able to develop higher levels of abstract thinking. And since this is one of the main problems that have been identified in autism, 'e_Motion Lab' research takes the specific object and then generalizes it to create a prototype image or memory of it. The digital data can then be treated like clay or other materials to manipulate, pull and push the data to play with iterations of the very same prototype.

Temple Grandin's work in 'Thinking in Pictures' encourages visual thinking over verbal expression. She talks about the frustration that the child will experience by not being able to label and express a particular emotion, resulting in the child's turning away from emotional data and instead concentrate on objects, toys or systems that are more reliable. By introducing models that the ASD person can identify with this will be a huge opportunity to create specific and recognizable representations of emotions almost on demand. The lab is linked with an adjacent rapid prototyping set-up where we hope to introduce 3D printers that range from handling material output that is soft resin, hard and porous plastic/ceramic shell and paper modeling using lasers, additive and substructive sintering machinery.

Temple Grandin elaborates on her particular interests in systemizing designs. She explains that the ASD has developed a hypersensitivity to detail and individual blocks of information. ASDs often are talented in the breaking down of complex models or designs into small parts.

Grandin is a high-functioning autistic person, and in the near future we will be working with ASD adults and ASD artists and designers who would be encouraged to work with complex data sets; they would be touching the data using haptic and other sensory tools. We speculate that their particular sensitivity with touch and feedback will produce a unique body of designerly and artistic work. The fluid data set would offer a rehearsal situation for their emotional frustration, they will be altering faces or change objects to their liking. And I hypothesize that this body of work will be revealing insights into the unique haptic and sensory skills of the emotionally challenged ASD. (REB approval in process.)

As mentioned above e_Motion Lab works not only with autistic people. We collaborate with artists and designers on creating through haptic devices and visualization tools and techniques. We recently received funding to stage a PlayShop workshop series employing a Play Methodology. My particular workshop hopes to deliver insights into emotions and feelings and the use of technological tools and to apply these findings to enhance the potential expression of emotions for the ASD person.

Emotions and feelings are probably the most confusing phenomena for psychologists, biologists, and those working in general in the sciences and humanities alike. Artists and designers have over the centuries devoted themselves to work on questions of and around consciousness and emotions. This is not just because emotions and their expressions often withdraw themselves from verbal reports but they are expressed equally both internally as feelings and sensations and externally as bodily gestures or facial expressions.

Being such a complex issue many influential researchers have engaged in emotion studies; Charles Darwin was as an early figure of evolutionary biology and William James (1890) an early key proponent of the psychology of consciousness; Dennett as a contemporary philosopher within cognitive studies, and his method of heterophenomenology, when it comes to the study of one's own mind. But if it is for Dennett we are all just conscious robots. On the other hand Joseph E. LeDoux and Antonio Damasio confront us with their neurological views. In Descartes' Error (1994), Damasio outlines how important emotions are for rational decision-making. He explains that reason and emotion are not separate; instead, mind and body need to be examined and explained in tandem. Damasio also explains the difference between emotions and feelings, as emotions happening in and with the body, while feelings are reflective and conscious experiences in the mind.

For facial expressions, emotions and bodily emotional gestures I want to highlight here again the work that Paul Ekman has done over many decades. Ekman's examples of how to read emotions on faces will be explored. Ekman created hundreds of photos; some are collaged works since they are difficult to make on demand. One approach in the workshop will be to improve our ability to read the face of the other. We will mimic and play with toys, so as to create a basic means of communications between ourselves.

We will study Robert Plutchik's psychoevolutionary theory of emotion in more depth to employ his wheel of emotions in our Play workshop session. If we consider his elaboration on emotion and cognition, emotions are really developed to help predict future events. Emotions are there for survival of the species and they serve as cognitive information about our environment. In that sense they are not linear events but feedback processes, they are in loop to restore a state of equilibrium in the body. This is true

for internal as well as external stimulation i.e. dreams trigger much of our emotion processing in the amygdala of the brain, where emotional data is mainly being processed.

As for the planned three-dimensional colour wheel for emotion concepts, Plutchick has developed a 'circumplex' model that not only represents emotions and their intensity but also explains how emotions can be combined. In addition the wheel has been used as a tool for personality labeling. I would hope that by playing with the model we will also examine how we relate to each other's emotional states.

The e_Motion Research Project (e_MRP) looks into Autism Spectrum Disorders as a model for understanding the mind of the other. With facial expression and reading emotions through an intersubjective approach, we explore both the relations with oneself and an object and the manifold relationships between subjects and externalized others.

Through these imaginative play or pretend play situations we create scenarios in which one engages in make-believe situations. Imagination and pretending helps children and adults to rehearse actions and sequences of actions; they can play out their ideas so as to rehearse for later in real life situations.

The Play Methods Workshop will be considered such a rehearsal situation. We aim to visualize the information we have gathered and hope to come up with some infograph/ sketches for the sessions. It is hoped that the visualization employs Csikszentmihalyi's theory of flow, the 'optimal state of experience' and deep immersion in the experience of one's self.

References and Notes:

Simon Baron-Cohen, "Does the autistic child have a 'theory of mind'?," Cognition, 21, (1985): 37- 46.

Mihaly Csikszentmihalyi, Flow: The Psychology of Happiness (New York: Harper & Row, 1992).

Antonio R. Damasio, Descartes' Error: Emotion, Reason and the Human Brain. (London: Papermac, Macmillan General Books, 1994).

Daniel C. Dennett, Brainchildren: Essays on Designing Minds (London: Penguin, 1998).

Paul Ekman, Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life (New York: Henry Holt, 2003).

Stanley I. Greenspan and Serena Wieder, ed., Engaging Autism: Using the Floortime Approach to Help Children Relate, Communicate, and Think (Philadelphia: Da Capo Press, 2006).

William James, The principles of psychology (New York : Henry Holt, 1890) Volume 1.

Joseph E. LeDoux, The Emotional Brain: The Mysterious Underpinnings of Emotional Life (New York: Simon & Schuster, 1996).

Rosalind W. Picard "Affective Computing," M.I.T Media Laboratory Perceptual Computing Section, technical report no. 321 (1996): 1 - 16.

Robert Plutchik, Emotions: A Psychoevolutionary Synthesis (New York: Harper & Row, 1980).

Robert Plutchik, "The Nature of Emotions," American Scientist, no. 89, 4, (2001): 344 – 350.

Temple Grandin, Thinking in Pictures: and other reports from my life with autism (NY: Doubleday, 1995).

STITCHTURES: INTERACTIVE ART INSTALLATION FOR SOCIAL INTERVENTIONS

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The purpose of this paper is to describe the design and development of Stitchtures-interactive art installation for shared spaces. Physical and digital co-design activities are described in the development of the piece inspired by biological systems and collective behavior. The combined methods respond to the specific aims of the project, which investigates the effects of design and technology interventions on aiding interactions among people.

no caption

INTRODUCTION

Interaction with other individuals seems to be a simple operation but may represent a challenging task for some people. Shared common areas in public spaces are great opportunities for interaction. Yet, sometimes they are highly underutilized. Designing interactive art installations for shared common areas

in public spaces can help people counter act lack of human interaction. An interactive design that benefits and grows from the involvement of multiple people may allow individuals to connect through interactive creation. The purpose of this paper is to describe the design and development of an interactive art installation, Stitchtures, for shared spaces. The specific aim of the project is to investigate the effects of design and technology interventions in aiding interactions among people.

STITCHTURES FRAMEWORK

The overall goal of the project is to investigate the effects of design and technology interventions among older adults in common shared areas. We identified different motivations to develop Stitchtures. One is related to increasing interactions among people. Another motivation is related to bringing people closer to nature and art. Lastly, motivating people to move is of central importance.

Stitchtures is an interactive art installation for people. It is a dynamic piece that encourages people to interact with it. As the interaction occurs, the art installation evolves. Consequently, evolution of the art installation is dependent on the interaction of individuals with both single (one individual) and multiple (multiple individuals) contacts. The installation consists of a series of overlapping three-dimensional patterns inspired by everyday objects. Interactions with the art piece occur via sensing technologies that were informed by biological systems. As people approach and interact with the art installation, visual feedback of differing modalities invite, motivate and engage users. The next sections describe the design and development of Stitchtures.

PHYSICAL AND DIGITAL CO-DESIGN

Designing an interactive art installation encompasses design in the physical and digital realms. These realms cannot be separated. Instead of foregrounding the creation of interactions and interfaces that map onto and access digital information, there is a need to explore when and how digital computational media can be drawn back to the physical environment and how physical interactions can model digital behaviors. [1] This practice can be referred to as physical and digital co-design. Co-design requires a collaborative and interdisciplinary team. As such, different disciplines including industrial design, human computer interaction, and computer vision were brought together to respond to the needs of designing an interactive art installation.

CONCEPTUAL DESIGN DEVELOPMENT

The design of this project began with team members from industrial design. Early explorations involved studying how to materialize interactions and how those physical representations can coexist with digital interactions. Initial explorations included developing concepts that addressed the ability for technology and design to contextualize users withdrawn from their surroundings. The design team began with a focus on studying patterns. One of the earliest considerations used analog cell phone flashers (flashing LEDs from frequency waves) to create reactions within a patterned system. In this version, the intention was to bring attention to the effect of self-isolation on one's surroundings and helping others realize that they are continually involved with their environment and those around them. The issue of the concept was limited by the fact that the end user would not consistently use such technologies to activate the interaction as expected.

During this phase, the team focused on studying examples of interactive art installations that were inter-active and reactive. Wall projects include the Adobe interactive installation; [2] the Aperture facade in-stallation with interactive and narrative displaying modes consisting of an iris diaphragm matrix, whose variable diameter is the main interaction with the piece; [3] and the Living Wall project, [4] which aims at creating electronically enhanced wallpaper with touch sensors, LED's and Bluetooth technology, al-lowing users to touch decorative elements of the wall to turn on lamps, adjust heating, or activate a stereo. Lastly, the interactive wall Mes Etoiles responds to proximity of people. The closer one gets to the wall, the larger number of dots are light up in the surface activated by the embedded proximity sen-sors and LEDs. [5] All these examples represent a way of using designed surfaces for people to commu-nicate or to build collective creations using their bodies as instruments.

Having examples of interactive art installations, Stitchtures iterations focused on surfaces development. Investigation of patterns included developing a moodboard containing references to adult's everyday objects such as clothing, linens, upholstery, décor and jewelry. The goal was to lead design decisions around familiar forms while avoiding the presence of obtrusive devices that may intimidate or discom-fort the users. This approach responded to the need of bringing about a physical design that was familiar to our end user.

As the refinement phase of the pattern progressed, a repetitive floral motif emerged, similar to a quilt. Quilts are physical comforters made of repetitive patterns traditionally composed of three layers of fab-rics combined using the technique of quilting. Meaning, the joining at least two fabric layers by stitches. This allowed the team be inspired not only to develop a layered three-dimensional pattern but also to use conductive thread for stitching the pattern as a unified installation. Quilts also evoke the idea that users are building this piece by stitching together the sections of a whole. Simultaneously, it also allows the design to be linked to nature by emphasizing the plant and floral aspects of the form.

Digital interactions were also biologically inspired. By looking at nature as a source of inspiration and in-novation, the art piece's core idea was framed on behaving like a living plant that requires care and at-tention (interaction). Through different versions, formal designs were simplified, abstracted and molded individually from natural variations of the Clematis flower (Clematis Vitalba, Clematis Jackmannii, and Clematis Stans respectively). As an integrated pattern, forms were refined by looking at the behavior of the liana. The liana vine uses trees and other vertical support to climb canopies to reach sunlight. This intertwining concept was adopted. The art piece was the designed with growing sections that perma-nently light up and, like the liana, they go from piece to piece and connect all the pieces as the art piece grows.

The final design consists of several layers containing a total of 52 modular pieces and distributed in a designated area of 97.25x84.50x10 inches from the actual retirement community common shared space. There are three different types of layers, which have a distinctive pattern designs. One of the layer designs covers a grid area of 4x4 modules with 16 modules. Each module is 21.75 x 21.75 inches. Additional layers cover a grid area of 4x8 modules with 28 modules. Each module is 21.75 x 14.75 inches. All modules are cut from transparent acrylic, of which two of the three distinctive designs are white fabric backed. These are attached by architectural aluminum rods, which allow the hard wiring to run throughout the piece. All modules are hand stitched with conductive thread to bring power to LEDs. Each modules hold white colored LEDs.

INTERACTIVE TECHNOLOGIES DEVELOPMENT

In order to promote a more natural form of interaction with the art installation, the interactive technologies development phase was based on behavioral patterns found in nature connected to communication. For example, behavioral communication patterns were noted in how animals interact at close proximity. As input mechanisms with the art installation, proximity patterns were defined to provide an active area large enough for two or more people to interact with the piece and prevent situations where users get drawn too close to each other that it repels them or too far from each other that they don't interact.

In terms of output mechanisms in the art installation, there was a need to provide an unspoken language that is easy to recognize to the users. Blinking was defined to lure users closer to the piece. The design decision was inspired by fireflies and how they use blinking lights to lure their mates. Additionally, the monochromatic white light and fabric mimics species without defenses that need to blend with the environment. [6] This mimicry creates a more relaxed invitation that uses the idea a defenseless animal to make the piece approachable instead of using the shocking invitation of bright colors to bring users into interacting with the art installation.

The result is an interactive art installation where the only form of feedback is through the use of monochromatic light. Sets of white LEDs accentuate sections of individual modules becoming the voice of the piece. Approximately 2000 LEDs create a series of organic patterns in three types of interactions: invite, engage, and motivate. Each interaction has its own method of communication (see figure 5).
For the invite interaction, blinking is used to attract users to the art installation. Once an infrared range finder detects a user in its 5-meter sensing range, the LEDs on the outermost layer starts blinking (pattern #1). As the user gets closer, the blinking slows down until the LEDs become permanently on.

At close proximity, the piece focuses on the engage interaction. This form of interaction is centered on real time feedback that responds directly to users' actions. Phototransistors detect shadows casted by users and immediately respond to the user's actions by creating dynamic light patterns in the back layer of the piece (pattern #2). The more users simultaneously interact with the piece, the more patterns become lit up.

Finally, to encourage users to continue interacting with the piece, the motivate interaction is implemented. Inspired by plant growth, the motivate interaction is based on the amount and type of user input. As users interact with the piece by activating the phototransistors, sections of the last layer (pattern #3) permanently light up. This permanently lit state represents the growth of the plant with ivy like shape. The more users interact with the piece, the more the plant grows and the more sections of the piece permanently light up. To control the growth rate, a timer determines when the next piece should light. The count is renewed when a new section is lit. Conversely, a second timer initiates to control the to decay of the plant, turning off sections when no interactions occur. Additionally, the piece accounts for collaborative actions in the motivate interaction mode by only lighting the center sections of the circles when two or more people interact with the piece.

CONCLUSION

Bringing design and technology to common shared areas in public spaces may increase social interaction among people. This paper described the physical and digital co-design of art pieces inspired by nature. Designing art installations to aid social interaction remains to be explored. Yet, Stichitures was designed to be an interactive installation that creates an environment which proliferates communication through

the meeting of design and technology. This dynamic piece encourages people to interact with it, which causes the art piece to evolve. However, the evolution of the piece depends on the interaction of multiple individuals; a single individual will only have a temporary effect on the piece. The co-dependence on others inspires communication between individuals, which builds to create a greater sense of connection on a human level.

ACKNOWLEDGMENTS

References and Notes:

1. *A. Mazalek, C. Winegarden, T. Al-Haddad, S. J. Robinson and C. Wu, "Architales: Physical/Digital Co-design of an Interactive Story Table," Proceedings of the 3rd International Conference on Tangible and Embedded Interaction (TEI'09), Cambridge, (February 2009).*
2. *Brand New School, "Adobe Mural Installation," Brand New School's official Web Site, 2007, http://www.brandnewschool.com/Projects/InteractiveMedia/AdobeMuralInstallation (accessed April 29, 2011).*
3. *F. Ryl, "Appeel," TheGreenEyl, 2009, http://www.thegreeneyl.com/appeel (accessed April 29, 2011).*
4. *L. Buechly, E. Lovell, D. Mellis and H. Perner-Wilson, "Living Wall," High-Low Tech's official Web Site, 2009, http://hlt.media.mit.edu/?p=27 (accessed April 29, 2011).*
5. *H. Barragan and A. Aitken, "Pared interactiva/ Interactive Wall," Barraganstudio, 2007, http://barraganstudio.com/projects/mes-etoiles/ (accessed April 29, 2011).*
6. *T. Caro, "Contrasting Coloration in Terrestrial Mammals," in Philosophical Transactions of the Royal Society B: Biological Sciences 364, no. 1516 (2009): 537-548.*

FLYING ROBOTIC ARTS FOR HRI AND INTERFACE RESEARCH

Nicolas Reeves & David St-Onge

The SAILS research program consists in developing geometric objects that can stabilize, move and rotate in the air, and that are able to develop behaviours and assemblages through emergent processes. This paper will focus on the qualitative results of this massively interdisciplinary project, which presents many examples of situations where questions and needs required by the art realm have led to techno-logical premieres.

Fig 1. Three Tryphons flying cubes from the SAILS project during the Geometric Butterflies performance. Winzavod Contemporary Arts Center, Moscow 2008. Photo by A. Ablogina.

Fig 2. Stelarc's prosthetic head, projected on a flying cube from the SAILS project during the Floating Head experiment. Elektra festival, Montreal 2010. Photo by Elektra.

1 - Introduction

The use of machines to convey impressions and emotions is everything but new. They are reports of vapour-activated automata, designed to impress worshippers in ancient Egypt. Human-like or animal-like automata were a trend in XVIIIth century Europe. As impressive as they might have been, these machines were seldom considered as art pieces at their time: they were more considered as pertaining to advanced crafts than to Beaux-Arts. Some were seen as amusement, or as demonstrators for their author's technological skills; others were scientific devices, meant to explain or understand biological phenomena. It is only by the end of the XXth century that robots began to be created for solely artistic purposes. From then, the progressive development of efficient automated learning processes, supported by the availability of sensors of all kinds, quickly led a part of the art community to create robots whose only objective would be to generate artificial emotions and impressions through interactive processes.

The SAILS research-creation program was originally developed for such purposes. Developed for now more than five years in the NXI Gestatio Design Lab, directed by Nicolas Reeves, it aims at developing autonomous cubic flying robots for artistic performances and exhibitions. It brings together engineers,

scientists and artists in a unique collaborative work process. [1] [2] The *Tryphon* is the latest aerobot developed within this program. It consists in a cubic polyurethane bladder surrounded by a cubic exoskeleton made from composite materials. Its overall size is 225cm. The Tryphons' predecessors were the prototype M180t (180 cm) and M170t (170 cm) *Mascarillon*, whose structure was made of basswood, and the M160c *Nestor*. This paper will discuss five performances with the flying cubes that occurred within the last years, focusing on the reactions that these objects triggered among various audiences.

2 - ROM<evo>

This performance took place at the Quebec Museum of Civilization in 2006. Three flying cubes, floating in a closed room, were programmed to avoid obstacles. The entrance of a visitor would trigger a series of events. First, one cube would stabilize in front of him. Then an external, adaptive video projection system would map on two faces of the cube the eyes of a hidden actress, whose voice, coming from hidden speakers, started a discussion with the visitor. The actress could actually see and hear the visitor through a microphone, a headset and several video screens. The scenario of the performance was similar to a robotic version of a Türing test; the actress was instructed to speak as if she was a machine, unable to understand the subtleties of a human language. For the robot, every word, every sentence was to be interpreted as a code: a system where each expression corresponds to one and only one meaning. It was unable to understand second-degrees, analogies, or metaphors. It began the performance with almost no knowledge about humans, and tried to accumulate information through its limited exchanges with the visitors.

A wealth of intriguing reactions intervened. Small babies were particularly attracted by the cubes. This was all the most surprising: apart from the gigantic projected eyes, no element of them could recall anything from human or animal beings that babies generally like. One hypothesis is that the slow oscillations and movements of the cube, which constantly repositions itself through its sensors and ducted fans, was seen by the toddlers as evoking a soft, gentle giant organism.

Another visitor spent a long time trying to teach a poem to the aerobot. The interesting point here is that the language of the cube is diametrically opposed, on a semiological level, to a poem: where the former tries to look like a code, a closed system where the meaning of each word is precisely defined, the latter corresponds to a form of text that is open to various meanings and significations. One can make the hypothesis that the visitor, knowing that the cube was eager to relate with humans, was trying to teach him a form of communication - art - that remains the privilege of mankind ; and to tell him implicitly that no real exchange would occur without a basic knowledge of the role of art on human communication.

Another curious event occurred when an old lady came into the exhibition room and began telling about herself to the cube. She came several times, and she talked about her feeling of loneliness; she explained that her children never visited her; and so on. Such a speech is not that surprising for an old woman; what is more intriguing is the fact that she could talk so freely about intimate matters to a huge cubical machine. Here again, we can only make hypothesis about her behaviour; but she certainly anthropomorphized the flying object to a degree. The presence of the projected eyes may have helped in that respect, but this is all but sure, since other visitors were literally scared by them. It may be more fruitful to compare this situation to a psychotherapy session: she may have seen in the cube an empathic entity that, precisely because it is so different from a human being, would not put any judgement

on what she was saying ; she could talk to it as long as she wanted without detecting on the cube symptoms of impatience or boredom that people frequently encounter when they repeat the same story several times.

This event also led to unexpected kinds of interactions. When a visitor was entering the room, the air currents created by his displacement and by the opening doors drawn more power from the cube's ducted fans, whose noise became louder. This created a supplementary reaction of the aerobot to a human presence. The same thing happened when groups of several excited youngsters came to speak together with the cube. Since their displacements were triggering air currents, and since the sensors detected more agitation, the cube looked excited as well, through its own reactions to the air flows, and through the reactions of its motors, which were striving to restabilize it.

Another intriguing observation has been made: the answer of the question to know if a human being was hidden somewhere in the system depended closely on the formation and education of the visitor. The people who were the most successful at finding the real answer were coming from the art community. Most scientists where convinced that the whole system was robotic, and that it included advanced modules for language interpretation and generation. It is worth remembering that no such modules existed in 2006, and hardly exist today. Further discussions revealed that the elements that led some people to find the answer where actually linked to very subtle changes and modulations in the eyes and voice of the actresses; these changes could never, for them, be generated by a machine : they could only be human. It is precisely this kind of observation that has the potential to open research tracks in psychology, HRI, neurosciences, and the like. This experiment led us to consider the impact on visitors of a similar aerobot whose vocal interactions would use a completely artificial system, based on a voice-recognition program coupled with an artificial locutor. This development has become one of our priority research axis.

3. The Summers of Dance in Paris

No direct interactions with people were planned for this event, which was seen only as an opportunity to test autonomous interactions in difficult circumstances, with large audiences. The aerobots would try to mimic human movements through their own translation/rotation vocabulary. All displacements were made through assisted, partially automatic remote control.

In the summer of 2008, we were invited to fly three Tryphon cubes for the Summer of Dance in Paris, within the gigantic nave of the Grand Palais. In such a space, the air streams caused by convection and differential pressures generate an aggressive flight environment. All the mechatronics and stabilisation algorithms had to be completely redesigned prior to the event, in order to ensure proper a behaviour of the cubes over a dancing crowd, in such a wide space.

Calibration times were particularly long because of strong air streams, and the system only worked properly on the second performance. The first performance had to be made through semi-autonomous remote control: the movements of the aerobots were partly induced by direct commands from the pilots, coupled with self-stabilization and collision detection. Our degree of control on the robots allowed us to make them act like dancers in the air, or even on the dance floor. Their movements were determined mainly by the reactions of the pilots to the music, which were themselves influenced by the general energy of the crowd: they became the equivalent of proxies for the pilots, of whom they became a sort of cubic flying embodiment. The audience seemed to share the space with a different and new kind

of dancer; the other dancers had to adapt to the presence of these huge moving objects, and to learn how to predict their movement so as to give them sufficient space to evolve.

4. Nestor and Veronique

This event took place in the Montreal Center for Sciences. It was the first completely interactive performance involving an actress and an autonomous cubic aerobot. It was based on a simple scenario, in which the actress would tame a Nestor flying cube by interacting with it through her movements and displacements. Each interaction was fine-tuned to be as precise as possible; but there is no way to predict exactly the behaviour of an aerostatic object in every possible circumstances. An interesting evolution occurred during the event : since the actress had to adapt her movements to the slow pace and to the unexpected movements of the aerobot, the performance progressively developed into a two-ways relationship, just like if the particular behaviour of the aerobot had influenced the behaviour of the actress. After several shows, everything happened as if the unpredictable movements from the cube induced the actress to react on an improvised, almost choreographic manner, which greatly enriched the performance. Some other unplanned reactions were caused by small drifts of the cube, when it was caught by sudden air streams; they actually added an anthropomorphic touch to the cube's behaviour, since small errors and imprecisions are more easily associated with humans than with machines. To our knowledge, this performance was the first experiment involving an interaction between a human being and an autonomous blimp.

5. Geometric Butterflies

This performance took place in Moscow during the spring of 2009, as part of a Science-Art festival. It was the first long lasting, totally autonomous performance for the Tryphons. The cubes were flying in an area surrounded by blue spotlights. They were instructed to avoid obstacles and to run away from light. The spotlights sent them towards the center of the flight area, where they met randomly with each other; their obstacle avoidance algorithms sent them back to the periphery, where they would detect again the light sources, and so on. This sequence created continuous, unpredictable orbits. When they were getting too close to each other, their collision detectors reacted quickly, at times sending them towards and over the audience. The approach of these huge objects was impressive: the visitors would quickly extend their arms to stop them. This was sensed by the detectors, which sent the cubes back to the flying area, creating a first occurrence of interactions between the cubes and a whole crowd.

Other kinds of interactions happened. Even when the Tryphons were in a near-stable position, the visitors tried to interact with them and to make them react through the light of their cellphones. This desire to communicate with the aerobots and to influence their behaviour through individual or group interaction brought us to the conclusion that any future performance with the cubes, even theatrical, must consider the audience as an integral component of the environment, and should benefit from its presence to develop new ways of interacting.

6. The Floating Head Experiment

This HRI-artistic public experiment took place in Montreal in 2010. It was the result of a many-months collaboration between our lab and the team of Australian artist Stelarc. [3] A Tryphon aerobot was combined to Stelarc's work *The Prosthetic Head*, which consists in a 5-meters-high projection of a 3D avatar

of himself, represented through a synthetic image, and linked to a chatbot-like engine in order to discuss directly with the visitors. Stelarc's artworks development is supported by the MARCS Auditory Laboratory in the University of Western Sydney. This team has transposed the Prosthetic Head into the Articulated Head, a new version that is embodied via a LCD screen attached to an industrial robotic arm; this added a strong level of expressivity to the Prosthetic Head : all facial expressions could be correlated to spatial translations and rotations of the screen, thus approximating the movements of a human head when talking or discussing. Thanks to various sensing devices, the team managed to develop an *attention model*, called THAMBS (Thinking Head Attention Model and Behavioural System), to enhance the effect of presence triggered by the synthetic face.

We quickly realized that the floating cubes of the SAILS project could play the same role as this screen, without the limitations imposed by a fixed stand. Through intensive international collaboration between our teams, we managed to realize a performance during which Stelarc's synthetic head was projected onto a large floating cube, whose movements and displacements in the air conveyed the head's emotions and impressions to the audience, while strongly enhancing the effect of presence of the virtual face.

7. Conclusion

The visitors' relations with the robots, as well as the actors' relations with them, proved a valuable and meaningful source of information and knowledge for the design of HRI procedures. In each performance, the visitors were seeking a contact with the robot, and initiated interaction processes. They may have wanted to test their influence on what they saw as a large machine, or simply test its abilities ; but more fundamentally, what could be gathered from our discussions with them revealed that they were attracted by the strange appearance of these slowly moving cubic organisms to which they would attribute a personality and a kind of proto-consciousness ; and that these artificial creatures put the visitors in touch with the fundamental human desire to communicate, even with an entity whose all elements betray the artificial nature.

It has also been observed that a slow moving cube was creating more positive feelings: visitors who accidentally triggered brisk reactions from one aerobot were generally impressed, and even afraid, when they realized that they were the cause of it. These reactions by neophytes proved quite informative in setting a preliminary common ground [4] for optimizing human-robot communications.

The development of interactions for performances followed a different path, since the performers had to get acquainted with the unpredictable reactions of the cubes that were caused by the parameters of the flight environment. This can be seen as a problem from an engineer's point of view: the repeatability and reliability of interactions are almost always essential for any technological applications. Things are very different in art; in this project, unpredictability may become a key ingredient in the definition of each cube's personality. Interactions whose repeatability ranges from "nearly precise" to "moderately imprecise" add to the poetic dimension of the cube, facilitating their assimilation to living organisms. These last observations leads to one of the main conclusions of this paper : endowing robots with basic sensory and interaction aptitudes, and putting them in close contact with humans in a given context and an intentional frame, provides a wealth of observations and data that can be fruitfully exploited for the design of optimal human-to-robot interactions.

From their artistic origin, [5] and throughout all the artistic development that surrounded their techno-logical evolution, the flying cubes demonstrate how several disciplines can contribute to the creation of objects that escape any attempt for classification, and hover over the undefined territories that stretch around the borders between arts, science and technology. We will borrow our conclusive sentence to the late Stephen Wilson : **«**Artists should be hungry to know what researchers are doing and thinking, and scientists and technologists should be zealous to know of artistic experimentation.**»**[6]

References and Notes:

1. *N. Reeves, J. Nembrini, E. Poncet, A. Martinoli and A. Winfield, "Mascarillons: Flying Swarm Intel-ligence for Architectural Research," Proceedings of the IEEE Swarm Intelligence Symposium (SIS 2005), Pasadena, CA, (June 2005).*
2. *D. St-Onge, N. Reeves and C. Gosselin, "A Modular Architecture for a Fast Parallel Develpment in an International Multidisciplinary Project," Proceedings of the 15th Conference on Advanced Ro-botics (ICAR 2011), Tallinn, (June 2011).*
3. *D. St-Onge, N. Reeves, C. Gosselin, D. Herald, C. Kroos and Stelarc, "The Floating Head Experi-ment," Proceedings of the 6th IEEE/ACM International Conference on Human-Robot Interaction (HRI 2011), Lausanne, (March 2001).*
4. *K. W. Lee, J. H. Hwang and D. S. Kwon, "A Comparative Study between Human-Human Interac-tion and Human-Robot Interaction," in New Challenges in Applied Intelligence Technologies, SCI 134, eds. Ngoc Thanh Nguyen and Radoslaw Katarzyniak, 2-12 (New York-Heidelberg: Springer-Verlag Berlin Heidelberg, 2008).*
5. *N. Reeves, J. Nembrini, E. Poncet, A. Martinoli and A. Winfield, "Voiles/Sails : Self-assembling Intelligent Lighter than Air Structures," Proceedings of the 10th Generative Arts Conference (GA2005), Milan, (December 2005).*
6. *S. Wilson, Information Arts: Intersections of Art, Science and Technology (Cambridge, MA: The MIT Press, 2002).*

THE GENEALOGY OF A CREATIVE COMMUNITY: WHY IS AFTERNOON THE "GRANDDADDY" OF HYPERTEXT FICTION?

Jill Walker Rettberg

This brief paper will question the role of the mythical progenitor in the creation of a creative communtiy. Are certain kinds of work more likely to be adopted as progenitor of a field, or does the choice of progenitor depend more on social networks, modes of distribution or even chance? Would electronic literature have been different today if Nichols or Malloy had been crowned as the grandparent of the field?

Granddaddy

In 1992, Robert Coover famously called Michael Joyce's *afternoon*, *a story* (1990) the "granddaddy of full-length hypertext fictions" (Coover 1992), writing only five years after *afternoon* was first presented in public (Bolter and Joyce 1987). Since then, both *afternoon* and Coover's description of it have been cited repeatedly in accounts of the history of electronic literature, whether in books, articles or teaching. *Afternoon* has been canonised by scholars, who reference the work far more frequently than any other work of electronic literature, by teachers and even, quite early on, by mainstream literary institutions , as it was included in the Norton's anthology *Postmodern American Fiction* in 1998. How did we come to accept *afternoon* as the unequivocal "granddaddy" of electronic literature (not just full-length hypertext fictions, as Coover in fact wrote)? Although earlier works are regularly mentioned when scholars and teachers recount the history of electronic literature, *afternoon* has certainly become the reference point and is frequently assumed to be the first work of "real" electronic literature. This amplification and reinforcement of certain ideas, works and citations is typical of a print-centric culture, Elizabeth Eisenstein wrote in her history of print (1979), but perhaps we should say, more broadly, that it is typical of a culture such as ours that privileges recorded texts, whether analog or digital, linguistic or visual.

Perhaps *afternoon* is indeed the granddaddy of full-length hypertext fiction, but it is certainly not the sole progenitor of electronic literature. That ancestry is extremely diverse, yet most of it has become almost forgotten, as the more easily accessible and more frequently taught works are referred to more and more often.

Beginnings

It took about twenty years for the early British novel to grow from a point when only five or six novels were published annually to a critical mass with new novels being published more than once a week. As Franco Moretti shows in his book *Graphs, Maps, Tree*, this twenty year timeline can be seen to repeat itself in a range of countries, though with different starting points according to when novels began to be published in that country (Moretti 2005).

Has electronic literature gone through a similar time line? Today, certainly there are new works of electronic literature published at least every week. Twenty years ago, in 1991, hypertext and other genres of electronic literature was not quite new, and although not many of them are remembered, there were at

least dozen or two dozen works being published each year. By 1986, and maybe earlier, five or six works of electronic literature were being published each year, even without including interactive fiction in the count. By the early 1990s, several publishers existed, including Eastgate, Voyager and Electronic Hollywood. With the advent of the web, of course self-publishing became even easier, and a number of online journals appeared that published hypertext fictions. By the turn of the century large organizations such as the Electronic Literature Organization, trAce and E-Poetry were established. So if we are to follow Moretti's twenty year time line for new genres, 1986-2006 appears to be a reasonable span.

Where should we set the beginning of electronic literature? Electronic literature began in many places, at many times. In 1952, in Manchester, computing pioneer Christopher Strachey created a love letter generator (Wardrip-Fruin 2005). In 1966, at MIT in Cambridge, Massachussetts, Joseph Weizenbaum created a simulated conversation agent, *ELIZA* (1966). In 1976 Will Crowther, another Cambridge resident who worked at a technology company, created *Colossal Cave Adventure*, the first textual adventure game, which was then further developed by Stanford graduate student Don Woods (Crowther and Woods 1976).

All these early works were created by computer scientists who were playing with the technology. They did not see themselves as authors, on the contrary, Strachey, Weizenbaum and Crowther all expressed surprise at their experiments being taken seriously by people. They had not intended to create a new form of literature, and were not, as far as we know, building on or even aware of other work in the field. Their work did not immediately start an avalanche of new literary forms. Indeed, they are only recognised as the starting points of electronic literature in hindsight (Wardrip-Fruin 2005).

Alongside the experiments created by computer scientists there were non-linear literary experiments that have also been seen as "proto-hypertexts", and as the starting points of electronic literature – but these were far and few between. Frequently cited examples include Nabokov's *Pale Fire* (1962), Saporta's *Composition No. 1* (1963), Cortazar's *Hopscotch* (1998) and Pavic's *Dictionary of the Khazars* (1988). Works by visual artists such as Len Lye's animated texts in film (1937) orJenny Holtzer's *Truisms* (1977) could also be included.

But none of these works was seen as connected to other works at the time. Although they are important in hindsight, they did not shape a community of electronic literature.

One community of experimental, electronic literature and art in the 1980s met on the WELL. Video and performance art curator Carl Loeffler coordinated the Art Com Electronic Network (ACEN) on The WELL where ACEN Datanet, an early online publication, would soon feature actual works of art, including works by John Cage, Jim Rosenberg, and Judy Malloy. Rosenberg's programmatic poetry *Diagrams No. 4* were published here, as was Malloy's database narrative *Uncle Roger*, which was "a hyperfictional narrative database". Malloy's works were also exhibited in physical art exhibitions.

On the opposite coast of the US, introductions were made through shared friends, by reading papers and journals and at conferences (such as the MacAdemia conferences in Philadelphia in 1988 and at Brown in 1989) and the ACM Hypertext conferences in 1987 and 1989. Stuart Moulthrop describes how at the '89 Hypertext conference he and John McDaid, Michael Joyce and Jay Bolter sat at a computer connected to the internet and searched for other people doing similar things. They found Judy Malloy's work:

It was just like blues men going to each other's performances. Yeah, alright, oh darn that's good. Oh, we're not that good. So we really recognized that she was somebody, and she was part of a community out there in the Bay Area that was really important and exciting. I can remember coming away from that moment thinking that, you know, there might be a real hope for what we were trying to do because other people were doing it. (Rettberg 2011)

In an interview with Ransom Center archivist Gabriela Redwine, Michael Joyce described how he came to realize that there was a community of readers passing works around informally even before there was a publisher or any of the institutions that conventionally support literature:

So—you had a physical community [of readers], like a book community. Same thing—similar story—with Jane [Yellowlees] Douglas when she first called me up and said I'm writing my dissertation on *afternoon*. I said, "That's impossible, you can't be, it's not published." She said, "Well, no, but I have it, you know. I've gotten it through so-and-so." So we were pretty much aware there was a community of readers out there. (Redwine 2009)

By the late eighties, several tools were available for creating electronic literature, including HyperCard and Storyspace. Additionally, many practitioners did their own programming, such as Nichols, Malloy and Rosenberg.

Eastgate became a central node in the hypertext fiction communities, as the primary publisher of literary hypertext. In an interview with Judy Malloy, Bernstein explained that he saw one of Eastgate's goals as providing shared references for the growing hypertext research community. The hypertext research field was growing, but before the web it was characterised by diverse, locally developed authoring systems. By publishing a series of hypertext fictions written in the same system, Eastgate managed to create a shared set of references: "These hypertexts helped focus discussion. For the first time, if you and I wanted to talk about the craft of hypertext writing, we could talk about a specific work we'd both read, a work with some ambition and scope, a work we could admire and with which we might disagree" (Malloy and Bernstein 2010).

As previously mentioned, Eastgate succeeded in creating what we may call a canon of electronic literature, and works published by Eastgate in the early 1990s are still taught and written about today. At the time, there were other publishers, including Voyager and Electronic Hollywood, but they no longer exist, whereas Eastgate, small as it is, and by no means mainstream, is still selling copies of those same hypertexts. Eastgate has been frequently criticised because it does not make works available on the web but instead only distribute works on disk, and because works have not always remained accessible on current operating systems. However, it is clear that works published by Eastgate in the early 1990s are far more frequently cited and taught today than contemporaneous works that were self-published or published by publishers that later shut down.

In addition to publishing Storyspace works, Eastgate also published works written in other authoring systems, and in some cases, ported work written in other systems to Storyspace. For instance, Malloy's *Penelope* was first written in BASIC, but Bernstein gave it the "Storyspace look and feel" and incorporated generative aspects of the work into Storyspace when the work was republished by Eastgate in 1993 (Malloy, email to author). In this way, Eastgate served to gather much diverse activity, incorporating earlier works into its catalog, including pioneering authors on The WELL like Judy Malloy and Jim Rosenberg.

At the same time, hypertext fiction was beginning to enter the college classroom. Among the most well-known teachers of hypertext of the time were George Landow and Robert Coover at Brown University, and Janet Murray who taught at MIT at the time. Landow, Coover and Murray wrote extensively about the field as well (Landow's book *Hypertext* was published in three editions, each about a decade apart), and each is frequently cited.

This is the period before the web took over as the main communication channel for authors and readers of electronic literature, and the period before dedicated organisations and events such as the Electronic Literature Organisation or the E-Poetry series had been established. Although the internet existed, and some authors were connected to each other through bulletin board systems such as The WELL, the version of this history that we hear the most frequently centres around the publication of a few, very heavily cited key works, by a single publisher, Eastgate. The period has been called "the Storyspace school" (Aarseth 1997, 85; Hayles 2007) or "the Storyspace era" (Raley 2002, 194; Kirschenbaum 2008), because the field was dominated by works written in the Storyspace software and published by Eastgate. As we have seen, this may not have been entirely true, but this is how the period looked in hindsight. Later, Coover dubbed these pre-web years "the golden age" (Coover 1999), in part because of the dominance of text. Early hypertext fictions, Coover wrote, gave careful readers a sense of "losing oneself to a text (..) until clicking the mouse is as unconscious an act as turning a page, and much less constraining, more compelling." (Coover 1999)

The web may bring with it a different kind of electronic literature and different conditions for readers, but more importantly for this paper, it brings with it very different affordances for writers and readers to communicate with each other. Communities can grow very differently on the web than they could before it.

Five Categories

Why are certain works more frequently cited than others? One likes to assume that it is the best works that are remembered, but contextual circumstances are also extremely important, and it is the context and the community I am interested in in this paper. Thinking about which works of early electronic literature are remembered today we can see five categories. These categories do not correspond to genres or literary qualities, but to the ways in which works were disseminated, documented and preserved.

1. There are many examples of *isolated experiments* that are regularly offered as examples of protohypertext or very early electronic literature, although they are more often mentioned as part of an obligatory literature review at the start of a paper than they are analysed or discussed in detail.
2. The second category of early electronic literature is *the canon*, as we might call it, the works that have been taught again and again in colleges and universities and that are frequently mentioned and discussed in scholarly works on the field. These correspond to a selection of what several authors have called "the Storyspace school".
3. *Works published by now defunct publishers* may have received some critical acclaim at the time, but are no longer available and are rarely if ever mentioned in current discourse on electronic literature.

4. *Self-published works*. Many of these works are no longer available, either because the website has not been maintained, or because the software or the web browser required to view the work is not compatible with current systems. Whether or not the author had other connections to the field is important here.
5. Some works, as today, were *performed* on an electronic network (as was the first publication of Judy Malloy's *Uncle Roger* in 1986, when nuggets of text were posted to discussion boards), and so of course can no longer be experienced as originally intended. There have been many works since that require synchronous experience, or that can be said to be performed as much as they are published. Works that are sent to mailing lists or that are told as a series of emails or tweets and other social networks are examples, and so are works that are constructed in MOOs, such as Coover and his students' *Hypertext Hotel* or the literary environments in *LambdaMOO* in the early 1990s. Without careful documentation, such works are easily forgotten, as they, unlike static websites or CD-ROMs, do not exist in their original form after their original performance.

What is a community?

What is a literary community? Traditional communities are defined by geography. A village grows around bountiful farmland, a city is strategically built by a natural harbour. Today families move to a suburb centered around a school and shops. Traditionally, people socialised, worked and made art with the people who lived nearby.

Communication technology allows for collaboration across distances, outside of the immediate, geographically defined community. The technologies of print and reliable postal service allowed literature, letters and newspapers to circulate among people with shared interests who lived far apart, allowing even a person living far from hubs of literary activity a certain amount of access to intellectual and artistic debates. Literary art forms are generally designed to be portable. We do not think of a novel as losing important context if it is read in Northern Norway instead of in Paris, whereas a painter or musician was forced to travel to where the exhibitions and concerts were to experience them.

Distributed literary and artistic communities, then, have existed to some extent since print and postal services made them possible. But most artistic communities have had a physical centre or centres as well. Artists and musicians have at different times in history known that to make it they must go to Berlin, or Paris, or Rome, or New York. Authors of electronic literature can connect online instead, meeting occasionally at gatherings or conferences.

Today the field of electronic literature is still not mainstream or familiar to a general audience, but there are many well-established meeting points both online and off: there are conferences, journals, mailing lists, blogs and research projects. There are universities that offer courses and degrees in electronic literature and anthologies that suggest a canon of important works.

Conclusion

The works of electronic literature that are still remembered from the 1980s have enjoyed the attention, as it were, of scholars, publishers, teachers and authors who have remained in the field for a long time.

Although Eastgate did not begin publishing hypertext fiction and poetry until 1990s, it is the Eastgate versions of earlier, self-published works that are still remembered. Works published on now-defunct publishers are orphaned and rarely discussed, largely because they are no longer accessible. At the same time, the social networks around conferences and teaching institutions were key, as were online groups such as the ArtCom forum on the WELL. These online groups may no longer be remembered by many, but they served to connect authors and artists who then went on to receive a wider audience. I have not found any examples of solely self-published works that have been continuously discussed in the two decades of scholarship and teaching since the 1980s, although some workshave been recently revived and made accessible again and are now receiving new attention, such as bp Nichol's BASIC poems.

Working on this short article I have realised how much more there is to learn about these early days of hypertext and electronic literature. I hope to interview more of the actors and gather more information about the period, which is key to understanding the emergence of electronic literature, but also valuable in understanding the broader ways in which creative and artistic communities emerge. What appears clear at this point is that works that were self-published have tended to be forgotten. Whether this is simply because they cease to be available or because they were never much discussed due to a lack of social and artistic connections (i.e. nobody was aware of the works in the first place) is not easy to ascertain as the discussions, online or off, of the time are not generally archived. Of course, publishing with an established publisher was no guarantee for being written into the history books either. Voyager was a far larger company than Eastgate in the early 1990s, and many works published by them received great critical acclaim at the time, but their works are no longer available. With the advent of the web, these dynamics changed significantly, and today we also have many conferences, journals, college classes and organisations focused on electronic literature.

What, I wonder, will determine which electronic literature of today is still discussed in twenty years?

Acknowledgements and further information

References and Notes:

Aarseth, Espen. 1997. Cybertext: Perspectives on Ergodic Literature. Baltimore and London: Johns Hopkins UP.

Coover, Robert. 1992. "The End of Books." The New York Times, June 27.

———. 1999. Literary Hypertext: The Passing of the Golden Age. In Digital Arts and Culture. Atlanta, GA.

Eisenstein, Elizabeth. 1979. The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe. 2 vols. Vol. 1. Cambridge: Cambridge UP.

Hayles, N. Katherine. Electronic Literature: What Is It? Electronic Literature Organization 2007. Available from http://eliterature.org/pad/elp.html.

Kirschenbaum, Matthew. 2008. Mechanisms: New Media and the Forensic Imagination. Cambridge, MA: MIT Press.

Malloy, Judy, and Mark Bernstein. 2010. The History of Hypertext Literature Authoring and Beyond. In Authoring Software: Application Software of Electronic Literature and New Media, edited by Judy Malloy.

Raley, Rita. 2002. "The Digital Loop: Feedback and Recurrence." Leonardo Electronic Almanac no. 10 (7).

Redwine, Gabriela. 2009. Interview with Michael Joyce. Harry Ransom Center.

Rettberg, Jill Walker. 2011. Interview with Stuart Moulthrop. Not yet published.

Wardrip-Fruin, Noah. 2005. Christopher Strachey: The First Digital Artist? In Grand Text Auto.

ARE YOU REALLY T/HERE? AFFECT, AFFORDANCE AND VITALITY IN HETEROTOPII OF FLOWS

Kate Richards

Immersive media art provides opportunities for audiences to engage with spaces, embodiment, processes and systems. Often predicated on audience mobility, it can allow for the creation of new relations and aesthetics of immersion, vitality affects and embodiment. Agency should now be understood as a process of participation and becoming rather than a simple facility. It is a calling and an inclination to act not simply a human 'affordance'.

Video still of Hong Kong harbour ferry from 'grove', an immersive media artwork by Kate Richards 2011. Image copyright Kate Richards.

INTRODUCTION

Media artists are increasingly concerned with creating works that are opportunities for audiences to engage with spaces and embodiment, processes and systems - in short, affective porous experiences that touch us pre-cognitively or before signification is brought into play. The event-space is often predicated on audience mobility, and aims to allow for the creation of new relations. There is a demonstrable shift away from reliance on content and signification, towards an aesthetics of immersion, affect and embodiment. Exemplars include James Turrell *Dhatu* (2010), and Olaf Eliasson *The Weather Project* (2003).

Media art practices aiming for immersion and intense embodied experience are framed by philosophies of affect, a fascinating and multi-dimensional field. Although its genealogy includes late 18Cth Romanticism and aesthetic discourses around the sublime, it has more recently been informed by innovations in neuroscience, embodiment and cognitive psychology. The affect theory taken up in this paper concentrates mainly on these latter areas of contribution. Simultaneously, media artists generating affective

artworks are influenced by - and sometimes driven by - new forms of engagement based on participation and interactivity, features now ubiquitous in mainstream and popular culture under the umbrella of experience design. In 2001 Erik Davis argued that we were already operating in an economy enacting predetermined 'experiences', and that the new material "being worked here" (Davies, 2001, p. 1) is experience itself. Necessarily embodied, Davies' summary of human experience is "… the phenomenal unfolding of awareness in real time, a movement which tugs against the network of concepts and significations while tending toward the condition of more direct sensation or intuitive perception. In other words, experience may not be able to escape the prison house of language, but it willingly sticks its nose out the barred window and inhales" (Davies, 2001, p. 1). Today, popular 'experiences' of embodiment are designed to easily incorporate the visceral, the narrative, the symbolic and the participatory.

Yet techniques of designing for interactivity and participation are strongly informed by theories of affordance as articulated through human computer interface (HCI) and design disciplines which hinge on object/subject dichotomies. The preoccupation with interactivity, affordance and participation can be restrictive and may be realised at the expense of affect. As Andrew Murphie explains it, agency should now be understood as a process of "participation and becoming" (Murphie, 2008) rather than a simple facility. It is a calling and an inclination to act not simply a human 'affordance'.

My practice-led research raises the questions: In an immersive porous environment of flows and particles, how do we understand and create for affordance? Can the affective flows and materials *themselves* have affordance?

AFFECT

Brian Massumi defines affect as the experience of an intense, embodied action/reaction sequence in response to the affordance offered by a space or event. Affect is essentially an intensity - a confluence of the physiological, the autonomic, the embodied that is not connected to the content of the image or the space in any direct or sequential way (Massumi, 2002, pp. 23-45). While both intensity/affect and qualification (depth reactions belonging to form/content level) are immediately embodied, it is affect that is a "non-conscious, never to be conscious autonomic reminder" (p. 25). For Massumi, the human subject will experience a series of embodied active reactions that precipitate their cognition of and their emotional response to, their physical environment. Affect precedes the human subject's cognitive and emotional states.

This pre-linguistic call-and-response between our bodies, other bodies and objects happens in the first nano-seconds of visual/aural encounter. The natural and built environments offer us degrees of affordance, that is, opportunities to engage with three-dimensional spaces and objects. At these initial moments of embodied perception, we have already virtualised the object of our gaze – despite it being two-dimensional at the visual level. We perceive, we know, we ken, its potential as a navigable three-dimensional thing – we imagine its reverse side; we get its texture and mass as the light bounces and plays upon its surface; we sense its weight from these other factors. In its virtual, already-perceived form - a form given to us by our affective, embodied relations with it – the environment suggests to us its affordances - it offers ways in which we can engage it, embody ourselves with it.

AFFECT AS VITAL, CONTAGIOUS AND ECOLOGICAL

Massumi's work draws in Whitehead's radical empiricism and the 'extensive continuum' – affective events are continually emerging and layering in various dynamics, shedding light on the relationship between quantum physics and radical empiricism - quantum physics describes constantly shifting relationship that can only be fully understood retroactively - radical empiricism describes how every shifting moment is retroactively revealed in consciousness. Massumi discusses William James' analogy of experience coming in drops. But the accumulation of drops can also "come with "oceanic" feeling" (Massumi, 2010, p. 13)

Affect is everywhere in us, through us and beyond us – it's the culmination of a sequence of actions/reactions occurring in various and multiple registers of the physiology, a culmination that touches, animates and draws-in that elusive philosophical 'other' – consciousness. Minute instances assemble and connect to other events, evoking a sense of rhythmic waves of thinking-feeling that are simultaneously embodied and ephemeral. A recurrent theme is the vitality of affect, that there "is no subject, apart from the singular aliveness appearing in the object's generic wake. The subject is life. This life." (Massumi, 2010, p. 12) Affect varies in scale and intensity - occurring at a quantum level, and at a macro level. Like a fractal geometry it is manifold - its rhythms and patterns are discernable but not always 'true' to their physiology. For Stern, generalised affect moments precede the categorisation of feeling - there is a vital generality, a vitality in transitory experiences, ordinary everydayness. (Stern, 2004). For Ednie-Brown, vitality is a collective affair, life is in the resonance of events (Ednie-Brown, 2011). For Munster, there is vitality in transitory experiences, and affectivity goes viral, folding back on itself (Munster, 2011). For Stewart, "The ordinary registers intensities…" (Stewart, 2007, p. 10)

In this sense experience is an *ecology* that engages us with affective resonance - a vital, flowing, compelling and dynamic system of which the human is an active participant at registers variously molecular, physiological, aesthetic and philosophical. Affordances are not fixed but are moving, dynamic, surging qualities across time and space; experiences are layered in us like geomorphological strata, and these can be enacted and re-evoked in various combinative registers under different circumstances.

HETEROTOPIA

An interesting way of analyzing the affective resonance of immersive spaces is to posit them as heterotopii. In 1967 Foucault contextualized the idea of heterotopia within a conception of space that historicised three meta-eras – the hierarchical, pre-industrial of the Middle Ages; the Cartesian industrial space of modernism; and the post industrial era of a grid-space of emplacement. For Foucault "…we are in an epoch in which space is given to us in the form of relations between emplacements…" and "…emplacement is defined by relations of proximity between points or elements - series, trees, grids". (Foucault, 2008, p. 15). In his highly significant exposition on the rise of the network space, time is only one of the possible operations of distribution between elements that are distributed in space; "… the anxiety of today fundamentally concerns space, no doubt much more than time." (p. 18).

For Foucault heterotopii are not utopias in the Hegelian sense of transcendence - rather they are:

 "…real places, effective places, places that are written into the institution of society itself, and that are sort of counter-emplacements, sort of effectively realised utopias in which the real emplacements, all the other real emplacements that can be found within culture, are simultaneously represented, contested and inverted; a kind of places that are outside all places, even though they are actually localisable." (p.17).

Here there is disruption, modification or suspension of the apparent normalcy and continuity of everyday space; they are lacunae in the space of flows - they embody "the tension between place and non-place that today reshapes the nature of public space" (p. 5). Heterotopii are neither public nor private - existing in the overlaps they are collective and shared spaces in their own time/space framework.

Foucault posited six principles of the heterotopia. Their often-multiplicitious and juxtaposing functions have been culturally and historically specific. A heterotopia can embrace several temporal modes – cyclical, perpetual, transitory, accumulative. Apparently open yet exclusive, one might need to perform ritual gestures to enter. They may offer an illusory compensation. For example, the ship is "…a place without a place, that exists by itself, that is self-enclosed and at the same time given over to the infinity of the sea and that from port to port…goes as far as the colonies in search of the most precious treasures they conceal in their gardens…the greatest reserve of the imagination. The ship is the heterotopia par excellence." (p. 22)

The idea of heterotopia has proven highly resonant since its inception, and has permeated urban, architectural and cultural theories. Most salient here for media artists is the idea of heterotopia as a strategy for reclaiming places of otherness in the inside of an economised public life (Dehaene, 2008, p. 4) which is a good way of describing the role art and particularly the ways in which an immersive experience as a lacunae in the urban fabric, can provide a space of reflection, interiority and immanence. Stickells' (Stickells, 2008) looks at several urban design projects that emerge out of the tensions between the city's fragmenting physical fabric and its multiplying electronic socio-economic networks. The relevance and power of figurative, symbolic urban architecture is being replaced by spaces that respond to and manipulate existing flows, manifesting as "fields of movement with no structural orientation". Thus "a new form of public space emerges alongside an alternative social ordering of public space" (p. 255). The author describes the flux and mutability, the architectural potentials of datascapes as "socially integrative spaces: heterotopia of flow" that reflect new spatial continuums in which unimpeded flow is a new way of experiencing the city (p. 247). This new discipline of 'flow urbanism' aims to create integrative urban gestures, seamless continuous landscapes that are about the 'field of movement' and reflect the participants as 'plural and heterogeneous urban actors'.

Flow urbanisms arise out of a "network bound rather than a site bound reading". (p. 251). They foreground networking and aim to balance, integrate and design for mobility and event. Stickells asks how designers can balance intensity and flexibility, fluctuation and diversity of use - "the thrill of mobility and speed with…considered tactile and social engagement" (p. 250). This conundrum is close to the heart of making art that accounts for interactivity and participation in immersive spaces. As was my experience with the artworks *Bystander*, *Wayfarer* and *Foul Whisperings, Strange Matters* and my work on large public installations such as *Beautiful Minds – 100 Years of the Nobel Prizes* and *Lost City* for the Museum of Sydney (Richards, 2011), the success of such spaces "to function as social condensers is dependent on the relationship between space and programming [of events]…" (Stickells, 2008, p. 256).

AFFORDANCES OF FLOW

The contemporary focus on interaction in media modes is participatory and behavioural – audiences are encouraged to change, modify, personalise, add content and 'play' using game-like modes of engagement. So the focus for creation and analysis tends to be on the participatory, the performative, the procedural. Affect has an increasing relevancy because "… affect is much more powerful and central than

we may have thought—in everyday life as much as in theory. It is increasingly seen as key… to our understanding of cultural effects and also key to concept and process such as reason and agency." (Murphie A. , 2010) There is such an openness of outcome in interaction design that it's easy to understand that the whole question of affect is about a continuous process of drawing behaviour from the audience, in evoking rhythms and scales of intensities across time and space.

Massumi reminds us that form is actually a non-fixed attribute, and therefore we can apply the concept of form to generative, to participatory and to networked media art. Vision is always dynamic (as neuroscience now evidences) so that it brings movement and change to the form of the object at each viewing and during each viewing instance. (Massumi, 2010) This suggests that we might benefit from looking at and understanding different kinds of movement. Experiential dynamics, distinctions between kinds of movement and what difference they make are aspects of affordance that are relevant for artists working with immersive spaces.

For the design and creation of interactive artworks these attributes of form have real implications as the (art)work continues to unfold and engage the audience – if the interactivity is token, and if the work does not continue to evolve under the drive of audience input, then the affective potentials would presumably be limited. This may depend on the signification-load of the image: if we have to 'read' it and connect the elements with, e.g. narrativity 'what does that object, movement, sound signify in relation to what has gone before?' then those particular affordances might mitigate against affect.

In this way the engaged subject is a contemporary instance of the rhizome as described by Deleuze and Guattari. A rhizome is a flow not an imprint; it is not unconscious and closed in on itself but it is a structure of organised interconnection, a machinic assemblage of utterances embedded intrinsically within social discourses of power, drawing its roots and tubers from that power discourse. A rhizome is "agglomerating very diverse acts, not only linguistic, but also perceptive, mimetic, gestural, and cognitive: there is no language in itself, nor are there any linguistic universals, only a throng of dialects, patois, slangs, and specialized languages" (Deleuze/Guattari, 1987). And just as we understand the 'subject' as not unified, the rhizome has no fixed centre on which to pivot but exists as a set of dynamic imperatives across scale. There is a constant movement of meaning, non dominant and not fixed - and the rhizome can be ceaselessly modified - unhinged, ripped, inverted - by any configuration of audience. Deleuze and Guattari's rhizome is an important and resonant precedent in understanding digital terrains; as a model it accounts for heterogeneous, mobile, and imperfect networks.

Delueze and Guattari explain how the rhizome always has multiple entry points, and is open to performance. By fostering dynamic and rupturing 'lines of flight' between bodies, between fields, it is open and connectable - it is a system of intensities, variable speeds, transformations. Famously, the philosophers go on to describe the human body as rhizome, its nerve endings as tubers, and hence the body is able to engage with other rhizomes in an exchange and deterritorialisation.

SUMMARY

In devising for participation and agency in immersive interactive media art experiences, artists can move beyond conventional HCI ideas of affordance and the subject/object dichotomy. Audiences engage and interface with affective ecologies that afford embodied flows between the space and the audience as an open system of nerves, consciousness, shifting subjectivities. Thus the audience is the co-creator of the

embodied experience, rhizome to rhizome. The theory of the heterotopia of flows is particularly applicable for media artists because it can account for spaces that are fluid and porous, with soft borders conflating interiority and exteriority. Offering a moving field of inter- and intra-relations, dissolving the subject/object dichotomy with multiple affective affordances and the potential for affective resonance, the immersive media artwork can be a heterotopia of self- or interiorised knowledge.

References and Notes:

Davies, E. (2001). Experience Design and the Design of Experience. Arcadia: Writings on Theology and Technology

Dehaene, (2008). Heterotopia and the city - Public Space in a Postcivil Society. Routledge.

Deleuze/Guattari. (1987). A Thousand Plateaus: Captialism and Schizophrenia. Minnesota University Press.

Ednie-Brown, P. (2011). Architecture on Wire: Vitality and Experimental Life. NIEA Conference, UNSW (my notes from presentation)

Foucault, M. (2008). Of Other Spaces. In Dehaene/De Cauter, Heterotopia and The City(Dehaene and De Cauter, Trans.). Routledge.

Massumi, B. (2010). The Thinking-Feeling of What Happens. http://www.inflexions.org

Massumi, B. (2002). Parables for the Virtual - Movement, Affect, Sensation. Duke University Press.

Munster, A. (2011). Hahaha - 186,775,728 Views. NIEA Conference UNSW. (my notes from presentation)

Murphie, A. (2010). Affect—a basic summary of approaches. http://www.andrewmurphie.org/blog/?p=93

Murphie, A. (2008). Clone your technics. (Massumi /Manning, Ed.) inFlexions , 1.

Richards, K. (2011). http://katerichards.net

Stern, D. (2004). The Present Moment in Psychotherapy and Everyday Life. WW Norton and Company.

Stewart, K. (2007). Ordinary Affects. Duke University Press.

Stickells, L. (2008). Flow Urbanism - The heterotopia of flows. In Dehaene/De Cauter, Heterotopia and the city - Public Space in a Postcivil Society. Routledge.

HERDING CATS TO INFINITY

Peter Richardson

In this paper I outline the current findings of an on going investigation begun in 2009 at the *Visual Effects Research Lab* (VERL). The three-year project links the worlds of film. art, technology, and computer science. In sharing methodologies and promoting cross, trans and inter disciplinary understanding the project challenges established notions of visual thought and creates new synergies between scientist, artists and film-makers.
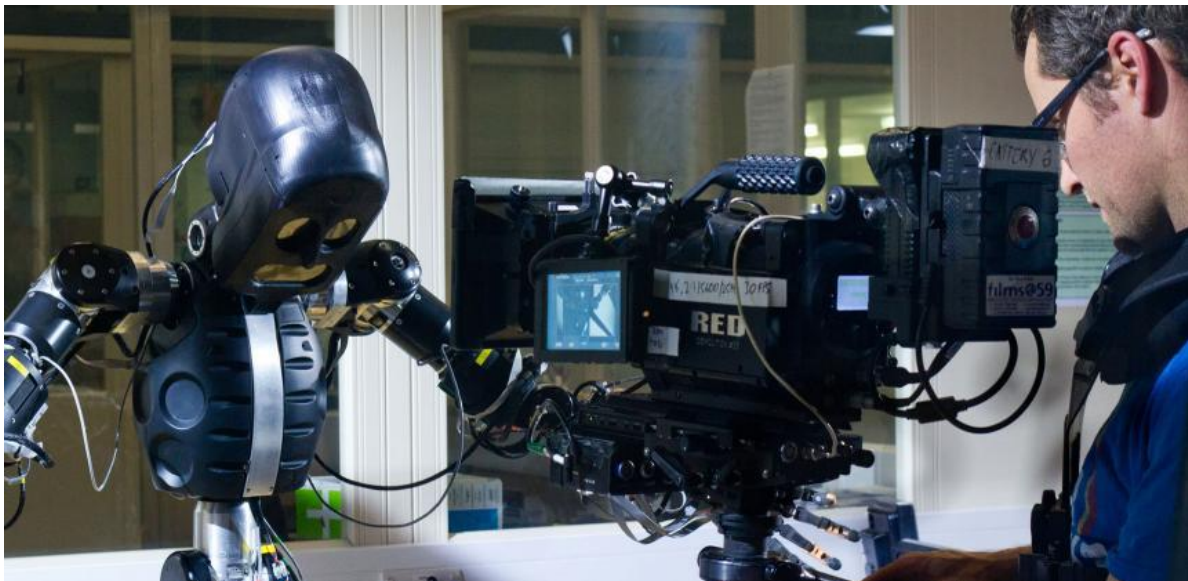
Fig 1. Filming Wendy McMurdo's 'Olympia' Bristol Robotics Lab September 2010.
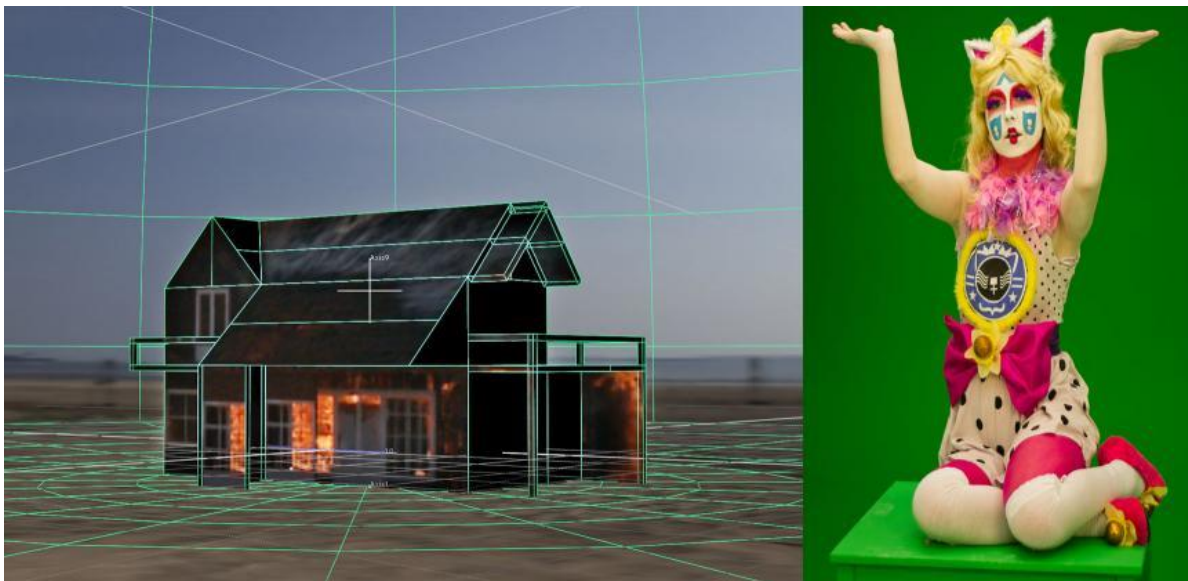
Fig 2. Left: 'The Return' Colin Andrews (work in progress) Right: Rachel McLean.

Introduction

This paper outlines and contextualises some current findings of an on-going investigation begun in 2009 at the Visual Effects Research Lab (VERL). The three-year project links the worlds of film, art, technology and computer science. In sharing methodologies and promoting cross-, trans- and inter-disciplinary understanding the project is beginning to challenge established notions of visual thought. The paper explores the issues surrounding the creation of four new high resolution [1] moving image works by contemporary artists. Working in collaboration with VERL the artists were invited to push the lab's state of the art visual effects facilities and team to their limits. The projects proposed envisioned: impossible ornithological stunts, buildings rising from burning embers, real and imagined robots and visceral fantasy worlds. Towards some initial conclusions the paper explores three questions: 1. In conceiving the works would any coherent themes emerge? 2. Would working with the Lab allow greater flexibility for the artists to create and experiment? 3. Would the potentially oppositional paradigms of film and art be challenged?

From Signal to Noise

The first turnkey digital effects system was brought to market by UK technology company Quantel in 1978. Over the next ten years Quantel continued to work with artists and designers to perfect their product. By the mid 1980's the paintbox system was the mainstay of television motion graphics. In 1985 artists David Hockney and Richard Hamilton were invited by Quantel to experience the Paintbox system. Hockney is reputed to have worked for 8 hours nonstop creating artworks with the tablet and pen set up. He described the experience as "painting with light."

In the spirit of Quantel's project, VERL and Creative Scotland invited artists to propose fantastical moving image projects un-realizable with incumbent technology. Four proposals from Scottish based artists Colin Andrews, Rachel McLean, Wendy McMurdo and Rory Middleton were commissioned. VERL collaborated with the selected artists to produce the works in high resolution with post-production using Nuke and Maya. (Whilst technologically advanced cinematic tools are at the centre of the project it is important to note that the content and context of the works proposed by the artists are the main focus of this paper.) The works are ultimately intended for cinematic exhibition and are shot in High Definition (1920 x 1080 pixels) as the lowest resolution and 4K (4096 x 2304 pixels) as the highest - roughly 32 times that of standard televisual definition. Andrews's "The Return" and McMurdo's "Olympia" will be discussed in detail whilst McLean's and Middleton's works will be described.

Cinematic visual effects tools such as Nuke, Inferno and Maya are ubiquitous in the creation of visual effects shots in Hollywood style feature films. The integration of live action footage with computer generated and enhanced imagery is a prerequisite of most adventure, science fiction and fantasy genre films. (The Harry Potter franchise, Lord of The Rings, Batman, and Inception exemplify this trend.) The VFX industry claims to "Bring together creative and technology specialists." [2] A survey of the VFX sector carried out by NESTA questioned 84 VFX Companies and found that "40% of respondents currently working in the industry are CG (computer graphic) artists." [3] Obviously the term "artist" here is applied in its loosest sense. This data provides an insight into not just nomenclature, but also into the potential creative allegiance of the industry to the artists and not the designer that it could be argued would be the more appropriate term. Skills and training in technology currently outweigh all other considerations for the VFX houses who habitually employ CG artists for their technological capabilities rather than their

conceptual talents. The VERL seeks to reverse this situation. VERL puts the tools of high-end digital creativity into the hands of the trained artist (mediated by artist-operators). It commissions works that are challenging conceptually and technologically. The creative imperative thus outweighs the technological: the notions of making and remaking become central to a de-objectification of the technological tool.

The Artworks

COLIN ANDREWS

'The Return' is both inspired by, and a reference to, the penultimate scene in Andrei Tarkovsky's feature film 'The Sacrifice'. In the scene the principle character Alexander, a distinguished theatre director, burns down his house to fulfill a pre-nuclear apocalyptic vow. Early during the filming of the 5¾ minutes scene Tarkovsky's camera jammed and the fire destroyed the house before the shot was achieved. Tarkovsky insisted that the house be rebuilt and re-burnt in order to shoot the scene a second time. This repetition along with the symbolism of fire, and the philosophical notion of the eternal return, are the inspiration and context for the work. The final film is a single screen work consisting of a 360-degree track around a burning facsimile of Tarkovsky's wooden house. The camera completes one 360-degree circle round the house and the fire slowly ignites. The tracking shot continues at a constant speed and on the same path until the building is completely burned and no trace of its existence remains. The footage then reverses and the house is reformed from the embers, fully forming again and returning us to the starting point (the installed work repeats from this point.) Andrews proposes an infinite making / remaking, he imagines and reimagines Tarkovsky's film: "The idea of infinity cannot be expressed in words or even described, but it can be apprehended through art, which makes infinity tangible. The absolute is only attainable through faith and in the creative act." [4] In Sculpting in Time Tarkovsky analyses cinema itself in terms of a physical making and remaking process. (His insistence on re-filming after technical difficulties exemplifies this notion in a practical way.) The notion of "Depicting Time" (the literal translation of Tarkovsky's book title) is central to this work and to the VERL project.

WENDY MCMURDO

12.30pm The Robotics Lab is closed, the lights are off. The doors swing open. We wander along the corridor. We pass whiteboards straining with formula and equations. The camera tracks through the empty lab to the aria Les Oiseaux Dans la Charmille from Les Contes d'Hoffmann by Jacques Offenbach. In her film "Olympia" Wendy Mucmurdo's camera stalks the robotics lab seeking out signs of life. Like a technological art school the scientists inhabit small studio spaces, partitioned and personalised, littered with the tools of the trade: aluminium tubes, carbon fibre panels, precision engineered forms, circuit boards and of course gonks. As we travel through this human free scene the robots flicker to life. A remote arm attached to a desk moves through a ballet of pre-programmed moves, a 'helper robot' glides past a series of wax finger moulds. We are climbing the hill towards a summit that in turn leads us into a valley. The aria builds, the robots are now human like. A disembodied hand flexes, its black rubber fingertips glisten: with sweat? But don't shake the familiar hand, people, because if we do we will be surprised: "surprised by the lack of soft tissue and cold temperature. In this case, there is no longer a sense of familiarity. It is uncanny." [5] We are nearly there. Now, the descent into the valley. McMurdo's journey ends with 'Jules'. He doesn't see us coming; he can't, he isn't human. Jules enjoys the aria, his head inclines towards the music, relishing each note. As the camera tracks, the back of his skull spews cables and flickering leads. That's it, we've arrived…. In his 1970 paper Masahiro Mori's gave a description of

"strangeness", strangeness represented by the "negative familiarity of a human observing an android," [6] he then coined the term "Uncanny Valley." "Climbing a mountain is an example of a function that does not increase continuously: a person's altitude y does not always increase as the distance from the summit decreases owing to the intervening hills and valleys. I have noticed that, as robots appear more humanlike, our sense of their familiarity increases until we come to a valley. I call this relation the uncanny valley." [7]

RACHEL MCLEAN

"My work slips inside and outside of history and into imagined futures, presenting a hyper-glowing, artificially saturated surface that is both nauseatingly positive and cheerfully grotesque." [8] Rachel McLean worked with the team to develop her previous Britney Spears / Mary Queen of Scots personas (from works such as 'Going Bananas' 2009). Each character (portrayed by McLean herself) is given Sisyphean tasks to perform; they are composited into an infinite high resolution mindscape. The resulting Technicolor mash up of performance and fairytale is as I write over 30 minutes long: this particular cat has yet to be herded.

RORY MIDDLETON

A modernist house (aged concrete and glass) sits on the edge of a Glen. In the sky a Golden Eagle - a Scottish archetype of strength and beauty - tracks through the highland landscape. The Eagle flies almost at ground level, the wind keeps her low. She rises on a thermal, turns into the sun then bears down on the camera, crashing sickeningly through an unseen window. In slow motion, glass splinters towards us. The bird of prey continues straight through the house. Time is suspended, she makes an unseen exit seconds later. In Middleton's vision of nature verses humankind the Eagle emerges unscathed from its encounter with C.G.I. brutalist architecture. In placing the camera inside the C.G.I. house the notion of distance in its simplest form (the distance of people from nature) and of framing and depth of field are playfully rearranged. Safe inside the house, nature is kept at bay. The intrusion leads us to question the very existence of the building in this landscape, a line has been crossed and time and place are questioned. Simon Unwin discusses the notion in his book on doorways: "Entrance is not always a clear cut matter of crossing a distinct and incontrovertible line. Sometimes the transition from clearly being outside to clearly being inside is not the matter of a moment, but drawn out taking time." [9] At the end of the work the Eagle lands in a tree. She casually glances back at the building as if contemplating its very existence. Finally we move into a close up: there is no house reflected in her eye.

A-N-T Avoidance

And so to Actor-Network-Theory. Latour's critique of his own terms are apt here; even though our artists are linked by their proximity they are as similar / dissimilar as Latour and his neighbour: "I can be one metre away from someone in the next telephone booth, and be nevertheless more closely connected to my mother 6000 miles away." [10] The connections made under the disguise of this paper then are merely alternate narrative strategies: the lab itself is a room full of computers not a network. The ideas generated are the sole property of the artists but are shared. The images created are merely data yet beautiful. The artists are unconnected yet connected and the artist-operators are productive yet creatively mediated. VERL as Actor Network: yes, but: it is the shift from technology to ideas and back, from distance to infinity, from data to shape, that characterize our current work, not the network /

mesh of ideas itself. As Law says: "If it is now time to abandon stories that tell of straining towards the center then this is because doing so has helped to perform alternative narrative strategies. Strategies that are not always narratives. Narratives that are not necessarily strategic. Alternatives that are about the making of objects and subjects. That are ontological. Alternatives that have generated the possibility of an ontological politics where objects may be made and remade, remade in different images." [11] So let's avoid A-N-T till next time and head out of the valley towards the frontier.

At the Digital Frontier? Initial Conclusions

1. In conceiving the works would any coherent themes emerge?

As I have discussed, the themes of: depicting time, distance / infinity and the uncanny valley dominated the works. The prevalence of hybridized notions of depth of field is also obvious. However it could well be argued that: by definition, depth of field is thematic to lens based media. Deleuze argues that: "The big screen and depth of field in particular have allowed the multiplication of independent data to the point where a secondary scene appears in the foreground while the main one happens in the background, or where you can no longer even distinguish between the principal and the secondary." [12] Middleton in particular perplexes us with his main focus: the Eagle giving way to the secondary scene; the building when the real story is humankind and its place in the landscape.

2. Would working with the Lab allow greater flexibility for the artists to create and experiment?

High-resolution artworks are not restricted to the digital artist's practice. Artists have habitually sought the highest resolution to depict the real and hypothetical. The very early (1504) still-life painting by Jacopo de' Barbari "Partridge, Gauntlets, and Crossbow Bolt" [13] is often cited as the first small scale trompe l'oeil painting since antiquity. (Paint as a high-resolution technology?) The painted panoramas of the late eighteenth century gave us Louis Daguerre's Diorama, a lit scene in a huge room, where manipulation of backlight through enormous paintings convinces viewers they are looking at a natural scene (a high resolution installation?). Which takes us to the spectacle of the Lumiere brothers' cinematic projections. People did not flee the cinema in terror but were nonetheless 'disturbed' (cinematic visual effects in an immersive high resolution installation?) With the experiment he VERL artists were able to create experimental cinematic artworks on a scale that wouldn't have been possible without the network. McMurdo's and McLean's works are cinematic (neither had worked with cinema technologies before) but designed for single screen viewing, whilst Middleton and in particular Andrews produced high resolution artworks with a durational / immersive element that are challenging to stage in any gallery.

3. Would the potentially oppositional paradigms of film and art be challenged?

The primacy of the 'artwork' is obvious throughout these projects. Each of the selected artists proposed their works mindful of the facilities on offer. VERL organized, filmed, edited and post produced using the traditional film methods but at no time did the working methods of film take primacy over the iterative / intuitive methods preferred by visual artists. The crews were without exception used to working on traditional film projects and looked to the 'Director' for instructions. The artist directors, unused to this method were forced to share and explain their vision with the crews. This led to a near unique (for filmmakers) situation of on set discussion and inclusion which aided the ideas development of each artwork. All of the final pieces benefited from this unusual (for film) working method.

This papers title is obviously mischievous. Why should a project of this scale be as pointless as 'herding cats'? From the beginning the artists displayed no feline tendencies, they were completely open to the rigid methods required to 'shoot for post'. They understood decisions had to be made in advance of shooting so as to maximize the potential of the high resolution technology. They were patient when the lab didn't have the answers. Eventually we learnt from each other: the clue is in the title we are the Visual Effects RESEARCH Lab, welcome to infinity Cats.

References and Notes:

1. *The term high resolution will be used throughout the paper but philosophically, 'higher resolution' may be a more appropriate but clunky term.*
2. *Ian Livingstone and Alex Hope, Next Gen: Transforming the UK Into the World's Leading Talent Hub for the Video Games and Visual Effects Industries (London: NESTA, 2011), http://www.nesta.org.uk/library/documents/NextGenv32.pdf (accessed June 8, 2012).*
3. *Ibid.*
4. *Andrey Tarkovsky, Sculpting in Time: Reflections on the Cinema (New York: Alfred a Knopf, 1987).*
5. *Masahiro Mori, "The Uncanny Valley," in Energy 7, no. 4 (1970): 33-35.*
6. *Ibid.*
7. *Ibid.*
8. *Rosamnud West, "The Skinny Showcase: Rachel MacLean," The Skinny's official Web Site, February 3, 2009, http://www.theskinny.co.uk/art/features/44929-the_skinny_showcase_rachel_maclean (accessed June 8, 2012).*
9. *Simon Unwin, Doorway (Abingdon-New York: Routledge: 2007), 198.*
10. *Bruno Latour, Reassembling the Social: An Introduction to Actor-Network-Theory (New York: Oxford University Press, 2005).*
11. *John Law, "Traduction/Trahison: Notes On ANT," Lancaster University's official Web Site, http://www.lancaster.ac.uk/sociology/stslaw2.html (accesed June 7, 2011).*
12. *Gilles Deleuze, Cinema 1: The Movement-Image, trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis, MN: University of Minnesota Press, 1986).*
13. *In the Alte Pinakothek Gallery in Munich, Germany.*

MACHINE MUSIC THROUGH THE EARS OF THE REPAIRMAN

Morten Riis

With its starting point in the homebuilt mechanical instrument *Steam Machine Music,* this paper will make a media archaeological examination of automatic musical instruments as experienced through the ears of the repairman. This will propose an alternative historical understanding of the relationship between musical content and its execution.
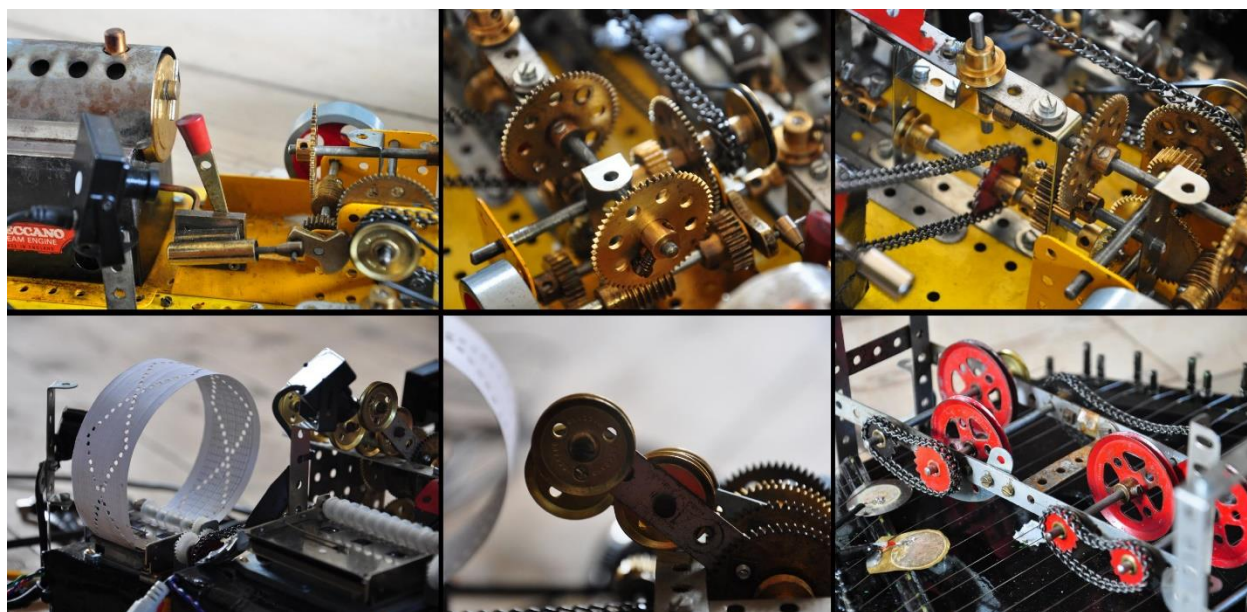
Steam Machine Music (2010) by Morten Riis, mechanical musical instrument. Copyright by author.

In this paper I will take on the role of the repairman. Both in terms of describing my musical performance *Steam Machine Music*, but also in relation of unfold an alternative history of automatic musical instruments that would give a tentative explanation of what kind of a role malfunction plays in the development of machine music. How can this history of the malfunctioning machine be used to give a broader, more diverse understanding of the way we tell the story of technology driven music.

Steam Machine Music is an automatic mechanical musical instrument built from vintage Meccano parts, and powered by a small steam engine. Taking on the role of the repairman in relation to this instruments performance practice would include taking care of issues such as thickness of the perforated paper, tension of the chains, steam pressure, maintaining power and energy level, oiling the cogwheels and dealing with the constant danger that the whole mechanism would jam. These construction and functionality related questions have been a constant challenge in the process of building and performing with this mechanical instrument. The instability of the entire mechanism is extremely noticeable, and displays and reflects the physicality of the real machine to an extreme degree. Everything is imminently

about to go wrong, a cogwheel that jams, a screw that loosens itself, a chain falling of, water running out, the loss of steam pressure, gas running out. One could state that this is physical mechanical glitch music, but in contrast to its post–digital counterpart, *Steam Machine Music* questions the whole practice and conceptualizing of machine music in a historical perspective that points to the fact that machines always have been malfunctioning, they have always broke down, there has always been a real physical mechanism that challenged the predetermined functionality of the machine. It has just somehow been forgotten or overlooked in our symbolic and deterministic focus of technology.

This traditional interpretation of machine music often regards technology in a symbolic sense that places the machine in a context where it is regarded as something that fulfills a predetermined task based on instructions mostly existing in a symbolic form such as code (text), notes or other symbolic representations of a desired functionality. In the attempt to frame these fundamental elements of electronic music, I ascribe to a media archaeological method, in which I will propose a different understanding of today's electronic music by making an archaeological examination of mechanical musical instruments. This is done by examining this history through the ears of the repairman, and listening to the voice of the machine itself opposed to the traditional 'musical' melodic output. In the history of the mechanical instruments the notion of 'machine sound' is as good as absent, but listening to these machines today and investigating alternative sources, it is evident that these machines are indeed not a silent mediator of a symbolic musical representation.

"Automatic instruments are documents," [1] as Fuller claims, but what sort of documents? The traditional musicological study of these mechanical instruments focuses on the distribution of musical repertory through a study of the tune list associated with the instruments, [1] and examining the various performing styles, melodic ornamentation and tempi. [2] As this musical data is regarded an authentic source to the musical performance practice of the time, nothing is mentioned about the performance practice of the mechanical instrument itself. The traditional method of analysing mechanical instruments is by examining the symbolic data inherent in the cylinders and perforated punch cards. These musical documents merely function as a symbolic database of past melodic and rhythmical general musical tendencies, but by fine–tuning the archaeological gaze towards the physical mechanism of the machine, it becomes evident that these mechanical instruments can tell us much more than the preferred tempi and tonalities of past popular tunes.

The following excavation will take a closer look at one of the most popular mechanical musical instrument of the 18th and 19th century, the cylinder music box, in an attempt to point towards an understanding that mechanical noise was an inherent part of the auditory experience of the mechanical musical instrument.

The Malfunctioning Cylinder Music Box

The cylinder music box is one of the, if not the, most popular mechanical musical instrument through the last three centuries, and its mass production has its birthplace in the western part of Switzerland in the 1790s were thousands and thousands were produced. [3] The music boxes come in a vast variation of sizes, shapes and designs, but the mechanism that produces the musical sound has maintained, with little variation, the same fundamental appearance and functionality: The tuned teeth in a steel music comb are plucked by metal pins arranged in the form of a musical composition on a revolving metal cylinder, driven by a mainspring. To power the cyclical musical box one or two spring motors were used with a key, a lever or a winding handle would wind. The energy of the spring is then transmitted to the

revolving cylinder by the use of a gear train mechanism. Special attention should be paid to a mechanism called the governor, which is a series of gears usually in connection to a form of a fan. This fan uses the air resistance to provide an effective way of regulating the speed of the cylinder, making it revolve at a constant tempo. [3]

Sources tell us that the cylinder music boxes had several unintended noises and errors that where typical and recurring phenomena in the daily use of these instruments. Noises and rattles that any musical box during the course of time will develop. [4] These mechanical noises are described as a grating noise due to the badly adjustment of the dampers that should dampen the comb. [5] The pins of the cylinder will also produce a harsh disagreeable sound if not properly oiled. [3] Furthermore if a cylinder pin comes in contact with a tooth on the comb, while it is still vibrating from a previous pin, a raspy, buzzing, harsh sound will be heard. [3] Also the effect of atmospheric conditions on the exact parts of the mechanism or the result of long use, led to tiny changes, which noticeably affected the performance. [6] Additionally one could mention that repairing broken pins on the cylinder, and broken teeth on the comb were a daily part of the music box repairman's routine. [4] Also at times it may be found that one of the wings of the air–brake mechanism (governor) on the endless screw is loose and will not stay in the exact position necessary for the movement to run at the correct speed. [5]

The *Mechanical Music Digest* archives [7] are an insightful source to the malfunctioning mechanical musical instrument. Hundreds of forum post from dedicated collectors and repairmen give an intensive insight into the world of these old instruments. Among other things the archive points towards some of the most common errors of the music box that is described as non–musical noises from the governor mechanism mechanical noise from the drive wheel together with buzzing sounds from the lid and the soundboard of the music box that sympathetically evolves into strong tones of the mechanical mechanism points towards the fragile malfunctioning reality of the music box.

A most detailed account for the malfunctioning music box is additionally found in C. H. Jacot: *How To Repair Musical Boxes – Practical Instructions to Watchmakers With Complete Illustrated Catalogue of Material*, third edition 1890 reprinted in. [8] In this popular repair guide (first two editions promptly sold out) we find accounts for how the repairman must insure that comb dampers are properly adjusted "otherwise the box will give certain disagreeable, whistling sounds, which greatly impair the effect of the music." [8] Also the repairman should be careful not to place the comb to close to the cylinder, which would result in the sound of the box will be harsh, and also remember that every screw must be fasten as firmly as possible in order to avoid rattling sounds. [8] Regular oiling of the cylinder pins and the rest of the mechanism in the musical box is required to prevent wear and screeching noises. [8] But the most dreadful scenario for the repairman is when the music box is said to "run". This phenomenon occurs when the cylinder is accidentally disconnected from the fly–wheel governor while the mainspring is still wound which results in the cylinder suddenly whirls with lightning speed resulting in parts breaking off, bending and breaking pins of the cylinder and teeth of the comb. Accordingly hundreds of boxes are ruined by this accident every year. [8]

These accounts of the malfunctioning tendencies found in the music boxes, clearly indicates that this mechanical instrument is not to be treated solely in a symbolic deterministic way.

Recordings of Mechanical Instruments

The actual sound of the automatic instrument can, besides experiencing the instruments live, be accessed through audio recordings. These recordings [9] are clearly auditory documents that tell the story of how 'unwanted' noises from the mechanism becomes very audible, and illustrate how mechanical noise and motor sounds become an integrated part of auditory experience of the mechanical instruments. Accompanying these recordings are liner notes that states "Every one of these instruments has a turbulent life behind it, and if this sometimes manifests itself in creaking, groaning or other authentic noises, this in no way dims the excitement of the acoustic experience." [9]

It is interesting to notice the use of a phrase such as "authentic noises" in this context, emphasising that the machine reveals its true self when it breaks or malfunctions. The authenticity is somehow connected to the failing machine, a machine that breaks down is somehow more true than a machine that functions perfectly accordingly to the anticipated functionality.

Constant Speed of the Music Box – Introducing Speed Regulation

Speed–regulating stands as one of the most important factors of the mechanical instrument, and at the same time the most difficult to ensure for the repairman. [6] Without regular revolving of the cylinder "the music would be worthless" as Kircher writes, quote from. [6]

The governor control mechanism used to regulate the speed of the music box has a long history that originate in the constant quest for more and more exact ordering of time. A quest that in many ways can be balanced with that of the symbolic deterministic ordering of the machine, thus more and more accurate timing ushers a stronger anticipation towards an exact comprehension of the machines functionality.

The self–regulating mechanism of the governor has of course a long and complex history, but in this context it is relevant to introduce the concept of 'resonant control'. This category of timekeeping uses the theory of an oscillating mechanism or material to ensure precise clock rate. These resonant elements come in a wide variety of forms, mechanical or electrical, where the gravity pendulum discovered by Galileo in 1583 starts the epoch of the resonant control. Later the development of electronic oscillator clocks and the quartz crystal resonator, invented in 1921, ensured even more precise timekeeping. [10] The quartz crystal was later used in computers to generate a steady and reliable clock frequency in CPU's. This steady clock is the basis on which all calculations are made; if the frequency becomes unstable it can have catastrophic consequences for the functionality of the digital system. [11]

The development of a more and more precise ordering of time has a profound impact on the way we construct our lives and routines, as Mumford states with the introduction of the "modern" mechanical clock in the 13th century, the machine changed forever modern civilization. [12] These clocks that first appeared in the European monasteries, placed a mechanical ordering of the twelve temporal hours of the day, but it also had a more profound meaning, namely as synchronizing the actions of men, and the bells of the clock tower almost defined urban existence. [12] Furthermore it is evidently that "The clock, not the steam–engine, is the key–machine of the modern industrial age," [12] and to elaborate on this statement it is the speed regulation, or the governor mechanism, that is the key mechanical concept in the ensuring of equal regulation of the machines functionality, thus creating and developing the sym-

bolic deterministic order of the machine. These regulating principles propose the possibility and development of the standardizing modern life. The accurate clock thus being "a new kind of power–machine, in which the source of power and the transmission were of such a nature, as to ensure the even flow of energy throughout the works and to make possible regular production and a standardized product." [12] In that way the notion of exact timing can be regarded as the foundation of the symbolic ordering.

Breakdown

The statement, "The only totally authentic medium is the functioning automatophone," [1] perfectly frames the traditional notion of how machine music has, and is regarded in a broad cultural context. But what of the malfunctioning automatophone? Is that not an authentic source too? By listening to the errors of the auditory history, by taking on the role of the mechanic one could reveal an inner hidden logic of the machine, and get closer to a more diverse and complex understanding of the machine. This notion that the machine reveals its logic when it breaks down is claimed by Benjamin [13] may in this context be regarded as a subscription to a real or physical ordering of the machine, which focuses on the malfunctions and irregularities, complementary to the symbolic notion of predetermined functionality. This predetermination relates to Wittgenstein's [14] account of the machine as symbol in which our comprehension of the predetermined movements in the machine as symbol is governed by the grammar of the language. It is included in the discourse surrounding the machine, more specific the use of certain words such as *have* and *must*, as seen in relation to the machines functionality. These linguistic constructions that are used to describe the machine, are maintaining the illusion of the predetermined actions contained in the machine, thus forcing us towards a symbolic comprehension of the machine, maintained by the discourse that surrounds it. And if we consider the components of the machine as figurative or symbolic representations, the movements of the machine will be no more relevant than the movement of the piece of paper it is drawn upon, thus completely disregarding the physical aspect of the machine.

This paper has very briefly introduced to the concept of machine music through the ears of the repairman. A story of automatic music in which the focus lies on the malfunction and irregularities of technology in contrast to the traditional history of technology that usually focuses on the benefits of new technological breakthroughs. With the history of failure many new possibilities present themselves in relation to account for the way we use and understand digital technology today. New possibilities that start with a breakdown.

References and Notes:

1. *David Fuller, "An Introduction to Automatic Instruments," in Early Music 11, no. 2 (1983): 164-66.*
2. *Arthur W. J. G. Ord-Hume, "Ornamentation in Mechanical Music," in Early Music 11, no. 2 (1983): 185-93.*
3. *Q. David Bowers, Encyclopedia of Automatic Musical Instruments (New York: Vestal Press, 1974).*
4. *John E. T. Clark, Musical Boxes : A History and an Appreciation (London: The Fountain Press, 1952).*
5. *Graham Webb, The Cylinder Musical Box Handbook (London: Faber & Faber, 1968).*
6. *Alexander Buchner, Mechanical Musical Instruments (London: Batchworth Press, 1961).*
7. *The Foxtail Group, "Mechanical Music Digest," MMD Forum, http://www.mmdigest.com/ Home (accessed July 26, 2010).*
8. *Arthur W. J. G. Ord-Hume, Clockwork Music (London: George Allen and Unwin, 1973).*
9. *Peter Schifferli, Instrumente Aus Der Sammlung Peter Schifferli, © 1981, Tudor, Vinyl LP.*
10. *Waren A. Marrison, "The Evolution of the Quartz Crystal Clock," in The Bell System Technical Journal 27, no. 3 (1948): 510-88.*
11. *Carnevale, Computer Error Anticipator, United States Patent Application 3548178, Al. 1970.*
12. *Lewis Mumford, Technics and Civilization (New York: Harcourt Brace Jovanovich, 1963).*
13. *Walter Benjamin, Illuminations (New York: Schocken Books, 2007).*
14. *Ludwig Wittgenstein, Philosophical Investigations (Oxford: Basil Blackwell, 1976).*

TECHNO-CULTURAL ASYMMETRY IN LATIN AMERICA

Claudio Rivera-Seguel

Present day technological assimilation processes offer new possibilities for the development of communities based on autonomous, distributed and collaborative networks. This opportunity places us at the cross-roads of a double-edged Latin American techno-cultural asymmetry paradigm. The following comparative analysis describes 10 New Media Latin American cultural initiatives contributing to the emergence of a new 'Transamerican Culture.'

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The LatinWare Meet-UP

"Once again, late for another on-line Meet-UP, like usual in our 'Maestro Chasquilla' – handyman – country. So of course, I got on my cell phone and started calling:
Me: Hello where are you, are you connected yet? 1st Friend: Hi. I am in San Pedro, because my Open Space in the city has no connectivity. Me again: Ok. Then let's try to see if we can connect to Skype. 1st Fiend again: Yes. But I don't have anyone's contact imagination. Me: Ok, ok. Just send me your user name and I will Bypass you.
She soon sent me a textuality with her data, and I transitioned her an invitation. She then called me once again and told me Skype didn't work. Right at this time, my 2nd friend suddenly popped up on the desktop and said:
2nd Friend: Hey man, it's my first time on Skype. Me: It's easy. We just have to simply bypass the system. 2nd Friend again: Yes, but don't really know what I am doing, I really need to visualize. Me again: Ya, ya don't worry. I will add you to the LatinWare Meet-Up ideology.
I immediately infoed him the step-by-step process, and managed to reconnect. Right at that point I got another cellphone call from 1st Friend. She streamed me about her tech difficulties, and that she hoped to subvert the future.
1st Friend: Hi. I am so sorry. I still have problems with the neo-liberal software. It works but informs me that "I will never be connected". Me: Ok. Try hacking the system. I will let 2nd Friend know about the tech asymmetry.1st Friend again: I have already tried restarting and reprogramming several times, and

no change, the system will just not work!!! Me: No, no let's try to figure out how to Trans-culturize. We must depolarize.

At this point, I found out she was connected on G-Talk. So we create a digital-analog bypass for the rhizomatic transformation. I had to physically placed one laptop on top of the other, thus another low-tech retooling solution for a Non-Problem." [1]

According to international market research statistics, during the last decade Latin America has undergone the third largest internet user growth rate, alongside with the Middle East and Africa, which hold second and first place respectively. But overall for the period 2000 to 2010, Latin America has had the largest global increment of internet users, rising from 18 million to 226 million users. [2] This rapidly expanding social phenomenon is contributing to the rise of enormous social transformations that are inevitably incubating and establishing new associative, communicational and productive organizational and political social structures.

Latin America – together with other technological expanding world regions – is undergoing an exponentially expanding technological assimilation scenario, which offers a unique opportunity for the re-organization and subsequent implementation of new types of socio-political models based on the establishment of locally inspired forms of distributed and collaborative networked communities. This new social networking scenario -characterized by self – organization and self-regulation – places emerging and underdeveloped regions at the cross roads of a double-edged 'Techno-Cultural Asymmetry' transitional historical context.

'Techno-Cultural Asymmetry': Refers to the technological and cultural differences amongst regions or nations concerning their distinct communities or geo-political areas. The extent of the differences depends on the levels of social development and technological assimilation of each area and their characteristics regarding their, technological engagement, cultural identity and/or economic prosperity. It is a recent phenomenon product of processes that accompany technological proliferation and globalization, generally associated with the emergence of counter-cultural social movements and inspired by 'Open Culture' ideology.[3]

Unfortunately, this techno-cultural condition is also creating a contradictory dilemma concerning social empowerment and political control. On the one hand, technology is facilitating people's access to web 2.0 communicational tools and information, which in turn facilitates the implementation of distributed and collaborative networks, but on the other hand, decontextualized regulating policies and associative methodologies conditions restrict their usability and impose developed strategies fostered primarily by an exo-centric and hegemonic global context.

Nevertheless, this apparent conflicting cultural scenario of empowerment vs. control may also be viewed as an opportunity, due to the fact that for the first time in Latin American history access to on-line content – creation and publication – and the establishment of collaborative networks are relatively inexpensive and easy to acquire at least for the majority of Latin America's new media cultural industry stakeholders, independent agents and consumers.

Within this complex and rapidly shifting techno-cultural scenario it would be expected – according to market projections regarding technological penetration – that most of Latin Americans will soon have the opportunity to engage with new and improved web 2.0 tools and information, therefore may one day be able to re-appropriate and re-invent their social, economic and political public domain. That is of

course if socio-political conditions don't undergo radical changes.

A preamble to this pro 'Open Culture' condition may be exemplified by the fact that during recent years, countries such as Brazil, Venezuela, Ecuador and Paraguay have managed to propose and implement the use of free software within their respective governmental administrative apparatus. The adaptation of this free software policy, in all cases has been twofold: It was carried out in order to reduce administrative and logistic government operational expenses, and to promote the public's appropriation of "Open Culture" tools and ideology.

These counter hegemonic political strategies by four Latin American governments may in some way exemplify the potential for the implementation of new social paradigm in the region, that may contribute to the establishment of positive and 'neo-democratic' social transformations. These Open Culture governmental policies are in part a consequence of Latin-America's present day 'Techno-Cultural Asymmetry' phenomenon, which are rooted within a communal intensive cultural identity and 'LatinWare' style survival ingenuity and tactics, all of which play key roles in understanding recent techno-cultural assimilation and development processes.

The following section of this paper briefly describes 10 Latin American new media cultural initiatives which, in different degrees of engagement, promote and/or incorporate 'Open Culture' methodologies and tactics within their mission and operational mandates. Most of these organizations have been conceived and/or inspired by existing regional and local cultural expectations and foster and/or implement associative, communicational and productive 'Open Culture' methodologies and web 2.0 techniques. Through these practices, these and many other emerging organizations offer local and regional and local cultural communal spaces for the reflection and promotion of contextually informed and holistically imbued cultural practices.

It is interesting to note that within the following 5 institutional initiatives, most of them are made possible through funding and collaboration from foreign institutions. They include: Paralelo, Anilla Cultural, CCE Network, Plataforma Bogota.

1. PARALELO: Euro-Brazilian Collaboration for the Promotion of Cultural Exchange for Sustainable Culture. Paralelo: Technology & environment, was a unique five-day project in Sao Paulo, Brazil, consisting of workshops, symposia and live events - supported and organized by the British Council in Brazil and the UK, hosted by the Museum of Image and Sound in Sao Paulo and the Centro Cultural de Sao Paulo, with the support from Mondriaan Foundation and Virtueel Platform in the Netherlands and the Arts & Humanities Research Council in the UK. It brought together artists and designers working with media from three different countries - Brazil, the Netherlands and the United Kingdom to discuss different ways in which collaborations across disciplinary and cultural borders to enable research and new insights into global and local ecological problems. [4]

2. ANILLA CULTURAL: An Iberoamerican-Funded Cultural Center Network. A New International Agora for Contemporary Cultural Initiatives. Anilla Cultural Latinoamérica - Europa is a co-creative, collaborative and participative network that links Latin America and Europe in the field of contemporary cultural initiatives incorporating the intensive use of the Information and Communication Technologies and the Second Generation of Internet. It has been articulated as a collective and innovative initiative to explore, generate and establish new forms of action and knowledge through networking that would allow access for people, groups, communities and countries to varied local and international experiences. Sound art, film, dance, visual arts, performance, multimedia, net art, theatre, literature, video art, exhibitions, festivals and concerts

are some of the various initiatives fostered by Anilla giving special attention to debate, research and experimentation through intercative conferences and the development of digital media libraries and multimedia laboratories. [5]

3. TALLERES EN RED: AECID's Collaborative Network in Ibero-America promotes the creation of Shared Workshops and Educational Initiatives. The Network Workshops have been established as a proposal to generate and spread content related to art and web 2.0 communication technologies. These workshops have been organized by the Spanish Cultural Centres in Ibero-America and are open to everyone interested in these topics. This proposal has been developed through courses and workshops given by renowned artists, researchers and theorists. This platform has the following objectives: To generate knowledge, connect different spaces and realities while establishing itself as a free content production space open to the community. [6]

4. PLATAFORMA BOGOTA: An Interactive Art, Science and Technology Laboratory. Plataforma Bogotá is a free-access laboratory that fosters production, research, training, and the promotion of art, science and digital culture. It is a space for creation that generates interdisciplinary crossings among a wide audience of different ages and training levels interested in carrying out projects for the development and use of Free Software, Open Source, and digital culture linked to art, science and technology. [7]

5. ESCUELAB.ORG is an organization in Lima, Peru that fosters young creators, theoreticians and activists to project their ideas -conceived in the present- to design and built possible futures in which the gap between technology and society will be addressed through imagination. Escuelab offers a dynamic and modular study plan, focused on the development of projects, which combine disciplines usually practiced independently from each other. This action facilitates transdisciplinary knowledge in the fields of art, science, technology and new media. [8]

One can note that the following list of independent media labs is a recent phenomenon, since they have emerged only within the last 12 years, and most of these initiatives are concerned with regional and international based projects. For the purpose of this paper I will only describe a few of them but you may refer to other examples of New Media initiatives, which may be found within the independent Latin American project MapaSur. http://mapasur.wordpress.com/ an online wordpress platform created and facilitated by Alejandro Duque. – You may view and add other local and new initiatives to this Map –

1. MemLAB: An enterprise working on web and video projects, creating free open source software and promoting the idea of free video encoding through the Open Video Alliance. They also develop experimental software for video mapping, and have created a plug-in to allow streaming video in Wordpress. In addition they have created tools for interactive installations, scenery projections and a series of web solutions always using the largest possible number of free tools. They have also helped develop Lives, a video editing software in real-time, and in studio. They are part of the Open Video Alliance, a coalition of organizations and individuals dedicated to the creation and promotion of technologies, policies, and practices in free online video, and are responsible for several actions in Brazil. [9]

2. AVLab: is a meeting platform for the creation and distribution of sound and visual arts from an open collaborative approach. Its objectives are: To offer a place providing information, didactic orientation, and distribution about today's sound and audiovisual creation. Also it seeks to promote encounters among people with similar interests: experimental and electronic music, sound art, and audio and video processing in real time, in general terms. [10]

3. LabSurLab: is a network of independant initatives conformed by hacklabs, hackerspaces, medialabs and all kinds of laboratories and biopolitical collectives working from and for South America

seeking to establish their own spaces for action and representation through experimentation and creation. [11]

4. ArTeK: The Art and Technology Cultural Corporation – ArTeK – is a non-governmental and not-for-profit Chilean-based organization created by a group of multidisciplinary professionals in 1999, in order to foster the development of cultural initiatives and creative projects at the intersection of art, science and technology. ArTeK's mission is to articulate and promote the integration of the arts and multidisciplinary creations, facilitate its access and dissemination, enhance their communication capabilities, offer training in various aspects, assist to stimulate its creative process and help to systematize the utilization of their resources. [12]

5. RedCATsur: is a network of artists, scientists, engineers, theoreticians and institutions promoting communication and collaboration in art, science and technology in Latin America. The network welcomes discussions and critical analysis in the field of art, science and technology in Latin America as well as information on events, artists' works, organizations' programmes and projects. This initiative does not intend to duplicate other efforts in this area. RedCATsur proposes itself as an open space for discussion and collaboration, more than solely for information exchange. It aims to facilitate cooperation within Latin America but it is open to individuals and organizations from all regions. [13]

The five independent media arts organizations described above correspond to only a few grass-root cultural initiatives in Latin America. From the characteristics and content development of these organizations, one may start to comprehend and analyze the possibilities of the emergence of a new 'Open Culture' social paradigm. These organizational and operational models may play a key role in understanding the possible establishment of new types of associative and productive social models in Latin America, since they seem to surge from a symbiotic collective spirit of resistance to globalization.

Some of the commonalities of these new media initiatives are:

- They investigate topics and issues related to: Sustainability, Open Culture and Self-Governance.
- They use operational tactics such as: On-line Networking, Technological Retooling, Adaptive Thinking and Collaborative Creation.
- Their organizational traits are characterized by a spirit of inventiveness, contextual awareness and proactive coexistence.

Some cultural factors that foster cultural resistance in Latin America:

- High costs for technological renewal.

- The urgent need for self-governance.

- The importance of traditional culture.

- An overwhelming belief in spirituality.

Most of these factors seem to be part of – and emanate from – the inherent Latin American techno-cultural asymmetrical context. Therefore its people have the unique opportunity to take advantage of new technologies and associative collaborative methodologies in order to re-appropriate and re-create a sovereign reality.

These social transformational processes, at least within the Latin American New Media arts milieu, are in part feasible or are developing because of the community oriented collaborative spirit, and in part because of the self-organizational needs that arise in order to address taboo or suppressed social concerns. This sub-cultural emerging resistance has at its core the driving force of the independent futuristic spirit, which articulates the inherent appropriation/improvisational tactics and techniques in order to bypass and/or coexist in parallel to traditional social organizational models.

In conclusion, global technological and cultural assimilation in Latin America – and other parts of the developing world regions – seem to have encountered an inherent and genuine spirit of resistance. Most importantly, its people are appropriating themselves of technology in order to establish the necessary social interconnections and collaborative channels for establishing a new distributed socio-political structure. If all remains in due course it would be expected that this symbiotic exocentric counter-assimilation process will establish a rhizomatic, non-hierarchical, collaborative social system which – sooner or later – will re-shape, nurture and facilitate the emergence of a new 'Transamerican Culture'.

References and Notes:

1. Text is inspired by a conversation of an on-line meeting between artists from 'PostaSur2011' Festival.
2. Internet Usage Statistics, "The Internet Big Picture," Internet World Stats' Web Site, March 31, 2011, http://www.internetworldstats.com/stats.htm (accessed August 15, 2010).
3. Definition is inspired in 2007 by Tomas Dorta Ph.D., University of Montreal.
4. Paralelo, "About Parlalelo," Wikidot.com, April 2009, http://paralelo.wikidot.com/ (accessed August 15, 2010).
5. Anilla Cultural's official Web Site, http://anillacultural.net/ (accessed August 15, 2010).
6. CCEBA, "Networked Workshops," CCEBA's official Web Site, May 2011, http://www.redcce.org.ar/talleresenred/ (accessed August 15, 2010).
7. Plataforma Bogotá's official Web Site, "¿Qué es Plataforma Bogotá?" July 26, 2011, http://plataformabogota.org/index.php/plataforma (accessed August 15, 2010).
8. Jorge Villacorta, "que?" Escuelab's official Web Site, January, 2009, http://www.escuelab.org/contenido/que (accessed August 15, 2010).
9. MediaLab Prado, "Networking or Disappear," MediaLab Prado's official Web Site, October 2006, http://medialab-prado.es/avlab2 (accessed August 15, 2010).
10. Erica Gonsales, "MemeLAB," The Creators Project's Web Site, June 22, 2011, http://thecreatorsproject.com/blog/memelab-fly-the-flag-of-freedom-through-open-source (accessed August 10, 2010).
11. Susana Aniara, "LabSurLab," Booki.cc, April 2010, http://www.booki.cc/labsurlab0/articulo-salvaje/ (accessed September 6, 2010).
12. ArTeK, "About," ArTeK's official Web Site, March, 2010, http://www.artek.cl (accessed August 15, 2010).
13. RedCATsur, "Red Latinoamericana de Arte, Ciencia y Tecnología," ListaRedCatSur, http://sites.google.com/site/listaredcatsur/ (accessed August 10, 2010).

GESTUS

Hector Rodriguez

Gestus is a moving image analysis and processing framework that explores the relationship between algorithmic procedure and symbolic form. The core technical and aesthetic concept is the vector, understood as a method of representation or symbolic form that expresses an abstraction of movement. Its aesthetic effects are best described via the vocabulary of cognitivist aesthetics, as the posing of a perceptual challenge to an active viewer.
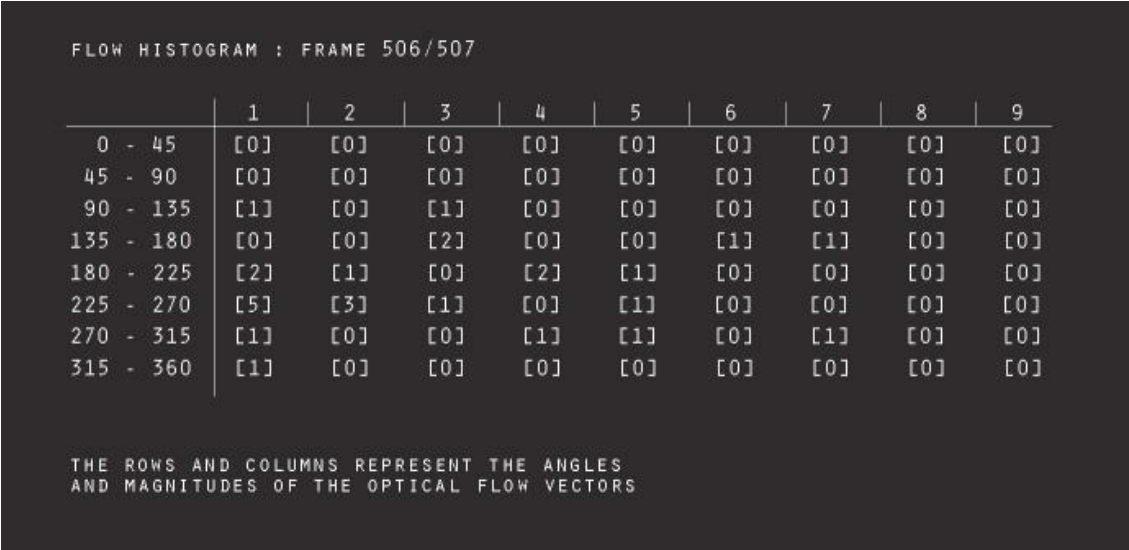
Fig. 1. Flow Histogram representing the magnitudes and directions of a set of flow vectors.

Fig. 2. Matrix display showing a video clip (center) surrounded by the eight best matches.

Vectoral Form

Experimental filmmaking can be seen as a radical critique of the conventions of linearity and transparency that characterize the conventions of "classical" narrative cinema. Classical conventions organize stylistic parameters around the clear and consistent communication of story information. The image is framed to direct the viewer's gaze to the main points of interest, relative to the main line of action, which supposedly unfolds in a coherent spatiotemporal domain and advances mainly through confrontations between goal-oriented agents. This dominant system always binds movement to objects and places. In this respect, classical narration draws on well-established features of ordinary cognition. Our awareness of movement is typically bound to specific objects and locations. We normally see (not movement as such but rather) some*thing* moving some*where*.

Experimental film and video makes have explored alternative modes of narrative organization and spectatorial address. In particular, there is a strand of avant-garde cinema that draws on the power of formal abstraction. Filmmaker Hollis Frampton, for instance, has called for "progressively more complex a priori schemes to generate the various parameters of film-making..." [1] The aesthetic potential of computational media lies precisely in its power to generate abstractions and so to extend this artistic lineage. This essay describes a particular kind of abstraction, which I call "vectoral form", and its potential utility as a method of avant-garde production.

The vector concept is here understood as a symbolic form, a method of representation. A pervasive feature of the cybernetic society, the vector plays a fundamental role in such control and surveillance tasks as motion tracking, action recognition, abnormal behavior detection, and video compression. These tasks substantially depend on algorithms that estimate the movements occurring in some image stream and then represent them as vector fields. A vector is an abstraction of movement. It is essentially characterized by two properties, magnitude and direction, and is often visualized as an arrow of a certain length and orientation. Vectoral form provides a sort of common currency that renders distinct movements quantitatively commensurable. It affords the possibility of measuring the similarity between motions by comparing the magnitudes and directions of their respective vectors. I claim that this abstraction potentially supplies the media artist with a radical principle of formal organization.

This essay explores the artistic possibilities of vectoral form in the context of the *Gestus* framework, a custom software system designed for the analysis and re-assemblage of video data. The system uses vector representations to search for similar movements occurring in one or more movies, and then displays those motions side by side as a split screen or multiple-channel projection. This emphasis on movement-as-such grows out of the technical role played by vector representation in the production process. The formal-aesthetic characteristics of the work are thus derived from the algorithmic principles that produced it. To quote filmmaker Malcolm LeGrice, *Gestus* tackles "the question of procedure as a determinant of form." [2] The technical procedure used here involves several steps.

Abstracting Movement

Assume that one or more "black and white" (grayscale) films are already available in digital form. Each film is represented as a sequence of frames and each frame consists of a two-dimensional array of pixels. The color of each pixel is represented as a floating point number in the interval (0,255). The first step in the algorithm normalizes the data by subtracting from the value of each pixel the mean (computed over all the pixels in one frame) and then dividing by the standard deviation.

The next step deploys an optical flow technique, in this case the Lucas-Kanade (LK) algorithm, to esti-mate the motion between each pair of successive frames. [3] LK assumes that clusters of contiguous pix-els move together as a whole from one image to the next. Take for instance a close-up of a person's face. The eye portion will occupy several pixels, which tend to move together as a single group from frame to frame. The algorithm implements this assumption by partitioning each image frame into rec-tangular windows or "flowpoints", each of which is then tracked as a coherent group. The output of the algorithm is a field of motion vectors that estimate the displacement of each flowpoint from one frame to the next.

The optical flow for the ith frame gives an estimate of the flow from the nth to the (n + 1)th frame. The set of optical flow vectors for a single frame can be represented as

$F_i = \{f_i1, f_i2, ..., f_ij, ..., f_iJ\}$

where

$f_{ij} = [X_{ij}, Y_{ij}, \vartheta_{ij}, S_{ij}],$

such that the coordinate (X_{ij}, Y_{ij}) represents the on-screen location of each vector, and ϑ_{ij} and S_{ij} repre-sent the orientation and velocity of the flow vector for that location. Optical flow data therefore consists of *bound* vectors, each associated with a specific position on the frame. A vector is bound if it has a defi-nite location, which can be described numerically via (e.g.) screen coordinates.

The algorithm then unbinds these vectors by abstracting away all location information. Flow data is quantized into $N_v \times N_\vartheta$ bins, forming a two-dimensional matrix or *flow histogram* (FH), which will be subsequently used as the basis for comparison. The (i,j)th entry of the matrix represents the number of vectors with magnitude i and direction j. (Fig. 1).The algorithm will henceforth proceed solely on the basis of the magnitudes and orientations of the vectors, not their coordinate positions on the screen, effectively treating all vectors as free (unbound) vectors.

Each FH is then further processed (in technical terms, the algorithm performs a Principal Component Analysis, and selects the top N eigenvectors) and transformed into a descriptor $x = (x_1, x_2, ..., x_n)$. I shall refer to these descriptors as "motion frame projections" (MFPs). Each MFP gives a highly abstract repre-sentation of the movement between two frames. The dissimilarity ("distance") between any two MFPs x and y can now be defined as follows:

$dist(x,y) = (x_1 - y_1)^2 + (x_2 - y_2)^2 + ... + (x_n. - y_n)^2$

This measure expresses a quantitative comparison between the movements of any two pairs of frames. It is straightforward to compute the distance between two video segments, each consisting of an arbi-trary number of frames, simply by computing the distances between each corresponding MFP and then adding them together. Two segments "match" if the distance between them is sufficiently small.

After obtaining MFPs for each frame in the film(s) to be processed, the algorithm groups them into short "matching segments" of fixed length. My first experiments used L = 2 frames (1 MFP), but it is more per-ceptually rewarding to compare movements that extend over several frames, so I settled on a fixed length L = 10 frames (9 MFPs). This length determines what counts as a single "instant" or "gesture",

from the standpoint of the searching and matching algorithm. It is then possible to select any arbitrary segment S0 of length L and search for other segments S0, S1, S2, ….of length L (which can but need not belong to the same movie) that closely match it. In the current version of this project, we select the 8 "best" (closest) matches, displayed as a matrix around S0, which occupies the central cell of a 3 x 3 grid (Fig. 2).

Aesthetic Effects

The chosen source material is Louis Feuillade's 1916 film serial Judex. There are several reasons that justify this choice. Feuillade worked within a tradition of 'tableau cinema' that relied on deep space staging rather than camera movement or analytical editing. Film theorist and historian David Bordwell stresses the director's skill at forming dynamically changing geometric arrangements of bodies in space, carefully directing the viewer's gaze to salient features of a scene on a moment-to-moment basis. "Such gentle geometries of movement hard to find in today's cinema, and observing them in Feuillade reminds us that long ago some directors crafted their images as two-dimensional patterns of bodies in space." [4] Bordwell has noted the rhythmic quality of cinematic motion in Feuillade's work: "Shots are subtly balanced, then unbalanced, then rebalanced…" [5] By focusing attention purely on the magnitude and direction of movement, *Gestus*foregrounds the rhythmic quality of Feuillade's deep space orchestrations.

The multi-channel display cues the viewer to engage in an active process of visual thinking, scanning the various images in an effort to identify the similarities between them. Her perceptual effort becomes an integral element of the vector machine. The system might display a human hand alongside a bird's face, for instance, thus revealing the kinetic resemblances of otherwise heterogeneous objects. This interplay of similarity and difference underpins the main aesthetic effects of the *Gestus* system, its visual demonstration of the difference between movement and the thing that moves.

Sometimes, the viewer easily detects similarities between the various images. In other cases, however, the movements are very subtle and occur in different areas of a crowded image, posing a sharper perceptual challenge. Perhaps a dropping hand near the bottom of one image corresponds to a leaning shoulder near the left edge of another. The system invites, challenges, and sometimes frustrates the spectator's cognitive-perceptual skills. The gaze is made restless. Although the software uses segments of fixed length, the moment-by-moment experience of lived duration sometimes expands or contracts, depending on the effort required to bring the various images into perceptual relation. This destabilization of the gaze demonstrates the transgressive possibilities unleashed by the abstraction of movement through vectoral form. Motion tracking techniques designed for surveillance and control are thus detourned and redeployed.

Liberate the vector.

References and Notes:

1. Quoted in James Peterson, *Dreams of Chaos, Visions of Order: Understanding the American Avant-Garde Cinema* (Detroit, MI: Wayne State University Press, 1994), 112. This book also provides a good introduction to cognitive aesthetics.
2. Malcolm LeGrice, *Abstract Film and Beyond* (Cambridge, MA: The MIT Press, 1977), 88.
3. Bruce D. Lucas and Takeo Kanade, "An Iterative Image Registration Technique with an Application to Stereo Vision," *Proceedings of Imaging Understanding Workshop*, Washington, DC, (April 1981), http://cseweb.ucsd.edu/classes/sp02/cse252/lucaskanade81.pdf (accessed June 8, 2012).
4. David Bordwell, "Revising Our Sense of Feuillade," *David Bordwell's Web Site on Cinema*, 2005, http://www.davidbordwell.net/books/figures_intro.php?ss=2 (accessed September 1, 2011).
5. David Bordwell, "How to Watch Fantomas and Why," *David Bordwell's Web Site on Cinema*, 2005, http://www.davidbordwell.net/blog/2010/11/11/how-to-watch-fantomas-and-why/ (accessed September 1, 2011).

THE WORK OF ART AND THE INTERNET. NEW CURATORIAL ISSUES: NETINSPACE – A CASE STUDY

Elena Giulia Rossi

The paper shapes from the experience of *NETinSPACE*, the project I curated at MAXXI — the newly born National Museum of XXIst Century Arts in Rome (2005-2011). With a theoretical, as well as a practical approach, it focuses on curatorial issues raised when dealing with artworks that employ the web as a territory for creation and as a means of artistic production, mostly when within the institutional walls.

Introduction

What is "new media" art? The relation of the term to the medium has been discussed extensively and controversially, in contrast to the ease with which we still categorize more traditional art according to technique, such as "oil on canvas" or "drawings on paper". New media art is generally perceived as existing outside the mainstream art system. This is particularly true for "net.art", a term that recognizes art practices that use the internet as a creative terrain and as a tool for artistic production.

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Much new media art can exist perfectly well without any institutions. But, as Christian Paul, Adjunct New Media Curator at the Whitney Museum of American Art in New York, has pointed out, "new media art constitutes a contemporary artistic practice that institutions cannot afford to ignore". [1] Conflicts that occur as these unconventional and mutable works come into contact with art institutions and their established parameters, inevitably affect curatorial practice.

The vast quantity of critical writings on the subject shows that there is no universally applicable paradigm. The analysis of case studies can therefore be a useful strategy in the exploration of a curatorial practice that is in constant flux, not only when dealing with new media art, but also when it comes to art that, since the avant-gardes and irrespective of the medium, has dissolved into a "gaseous state" *(état gazeux)* to use French philosopher Yves Michaud's metaphor. [2]

Issues of terminology, curatorial tasks and display issues, are here explored through my experience at MAXXI in Rome, Italy, where the NetSpace project was launched in 2005, evolving, by 2010, into NETinSPACE. It has proved to be an interesting terrain of curatorial research. Choices – of terms of reference and of display – have been part of the task. The curator, in her role as mediator between the artists and the museum, had to find points of convergence with the institution.

From NetSpace to NETinSPACE (MAXXI 2005-2011)

NetSpace (2005-2008), held at MAXXI when the new born museum was located in the neutral spaces of former military barracks whose shape inspired the design by architect Zaha Hadid, consisted of continuous events as well as an "active" archive closely linked to education and research.Thirteen consecutive events related to net art, including video-screenings and artists' talks, were held in the course of three years. The goal was to provide, throughout significant works and artists, an overview of then over fifteen years activity on the net during which these art practices were shared by almost only specialized artists and theorists. Computers gave visitors access to online works grouped in thematic cycles that addressed the general nature of the internet (i.e. *Content and Forms*, *Art and Virtual Identities, Electronic Landscapes).* The audience were invited to interact with the works, and to deepen their knowledge of historic contexts. The selection of works was never intended to be exhaustive, but to provide an introduction to modes of art production and thinking, new to the institutional scenario, and to encourage visitors to continue their journey by navigating the web – where net.art has originated – from their own (home) computers.

Historic context was a crucial component of the project. Essays realized in conjunction with the Department of Education provided content descriptions and located these works in art history, and in the artists' research. Their historic framing was a task of "interpretation" as intended by Beryl Graham and Sara Cook in their recent, extensive critical survey on curatorial practice. [3] Also, categorizing and defining this particular art form in this particular manner was a useful way of further contextualizing and exploring art practices that were still obscure to many – especially in Italy and at that time.

Now that net.art has crossed the threshold of institutions, despite meeting with some resistance, we need to move on and release it from its ghetto to consider it in the much wider context of idioms of contemporary art and culture in general. NetSpace was already travelling in this direction insofar as each event included international artists who tended to use relatively more traditional media but had begun to experiment with the internet as a tool of creative research. Francis Alÿs (*The Thief*, 1999), Arturo Herrera (*Almost Home*, 1998) were among these artists invited to experiment with the internet, as web commissions, by the newyroker DIA Art Foundation, a pioneer institution to pay interest towards these art practices.

This was the basis for the renamed project, NETinSPACE, which was launched on May 27, 2010, on the occasion of the inauguration of MAXXI, as a section of its first thematic collection called *Spazio/Space*. Part of it has moved beyond the computer screen to invade the museum's physical space, "infiltrating" the passages adjacent to the exhibition galleries. Established and emerging artists, working both on the internet and in a variety of non-web-based idioms, have shaped a new territory where diverse languages interweave and merge into one.

Katja Loher, Miltos Manetas, and artist duo Bianco-Valente were the first to embrace this challenge by creating site-specific installations at MAXXI/NETinSPACE. The web components that characterize each of their works were conceived both in their own right, for on-line viewing, and as extensions to site-specific installations, affording different perceptions. The internet functioned as both "tool" and "space", conceptually and physically meshing with the museum as a location.

KATJA LOHER - *SCULPTING IN AIR*, 2010

Young multidisciplinary artist Katja Loher's work was on display in the foyer which hundreds of people pass through from the main entrance every day. *Sculpting in Air*, Loher's work produced for this occasion, was one of many incarnations of her planets/universes in which choreographed bodies filmed from a bird's eye view come together to form the letters of a new language. In this instance, the post-production editing process orchestrated a dialogue between man and machine. Her projections onto large weather balloons *(Videoplanets*, since 2006), inside circular sculptures *(Miniverses*, since 2008), through coloured water in three glasses *(RGB Well*, 2009/2010), or inside glass bubbles *(Bubbles*, 2010) are just some of the ways in which Loher achieves the transformation of video into sculpture.

The audience's perception of and interaction with her work has always played an important role in Loher's explorations. The different ways in which her videos become sculptures also encourage different modes of viewing: while the balloon projections embrace the audience, the *Miniverse* sculptures force people to bend low to peer at the videos through holes.

Adding the internet component to *Sculpting in Air* enabled Loher to construct a much more complex scenario, pushing the game between observer and observed to its extreme: in the video projected on the front of the balloon, a sudden zoom-in of the camera frames the gaze of one of the dancers, establishing a strong connection with the observer. A moment later, this connection is broken by an equally sudden zoom-out which merges the dancer's face back into the ensemble. Meanwhile, the audience itself is also being watched. Images from a camera that films visitors as they observe the work are projected onto the rear of the balloon and incorporated into the "planet". From there, the images are returned in reverse live-stream transmission to observers who watch both video and filmed visitors on a computer screen located at a distance, in another part of the foyer.

Sculpting in Air emphasises a fragmented vision in which both sculptural component and mode of viewing are based on circularity. Moreover, the internet extends the voyeuristic aspect already present in her earlier works. This time, however, it involves both the online observers and the artist herself, who can stay connected to her work and to its physical visitors regardless of her/their own whereabouts.

MILTOS MANETAS - *IAMGONNACOPY*, 2010

If Katja Loher uses the internet as an experimental tool to extend the scope of her exploration, it is second home to Miltos Manetas. One of the first artists to produce oil paintings of the world of information (e.g. *Italian Painting*, 2000, in the MAXXI collection), Manetas is a pioneer in the use of the internet as a tool of artistic production. His presence in this new stage of the project was of particular relevance as this artist continuously moves between worlds with a forward-looking vision that embraces technological advances as well as new modes of communication.

IamGonnaCopy (2010), the title of Maneta's "action" conceived for MAXXI, constitutes the convergence of a number of elements from his previous on-line work, *IamGonnaCopy* (2001), and from his contribution to *Internet Pavilion*, presented at the 53rd Venice Biennial (2009), which included his manifesto, *Pirates of The Internet Unite.*

The initiator of artistic currents such as Neen, a name Manetas commissioned from Lexicon Branding, the artist has been constantly exploring the interface between the analog and digital dimensions. *IamGonnaCopy* (2010) is a synthesis of his past and present work. It is his vision of a new territory where body and information merge into a unified whole. Manetas' manifesto and new stickers bearing

the title of the work as a logo, design by Experimental Jetset, were distributed in various locations, with the Manifesto posted all over the city, and covering one of the foyer's main walls. The stickers were distributed by hand, and inserted in more than 5,000 copies of the free "cura.magazine". Everything came together in the web component, a platform where, apart from documenting his intervention in physical space, Manetas invited participants in cultural life to vote in favour of or against copyright. While the posters remain on the wall, having almost merged with it, the artist's action has moved on towards a "metascreen" [4] dimension in which a new, post-internet analog era is evolving.

BIANCO VALENTE - *EVOLUTIVE CONVERGENCE*, 2010

At a considerable distance from the main foyer, in the vicinity of the gallery dedicated to the work of architect Luigi Moretti, visitors encountered Bianco-Valente's *Evolutive Convergence,* realized for the transparent elevator that connects the ground floor with the upper level. The Italian artist duo has been exploring the boundary between matter (body) and the ephemeral (mind), experimenting with and using a variety of materials and supports, predominantly video. They are often engaged in site-specific installations related to interior and exterior museum architectures as well as public spaces.

Evolutive Convergence extended the artists' field of interest to a confrontation between real and virtual space that, exposed to mutual influences or cross-fertilization, evokes the functioning of universal natural laws. Ramification processes that are characteristic of trees, for example, also form the basis of most natural ecosystems, including neural structures. Bianco-Valente turned them into metaphors for the organization and visualization of the fluid space of the internet. For the web component, the branching patterns materialized in pastel on the museum elevator's four-meter tall glass surfaces were translated into flash images.

The elevator turned out to be an eminently suitable location to present their work from different angles, not least from the inside of the elevator capsule, which afforded a view of the surrounding space and art exhibits through the filter of the patterns.

NET.ART ON THE COMPUTERS

In a dedicated computer space, visitors could access information about six selected net.art works (1996 – 2008), i.e. site-specific installations as well as their web componets. Each project, both online and on location in the museum, addressed the theme of "space" in its virtual and physical dimensions, and their cross-fertilization. A moving, a-hierarchical cube flash interface gave access to works by Bestiario, Dr. Hugo Heyrman, David Crawford, Les Liens Invisibles (Clemente Pestelli and Gionatan Quintini), Boredomresearch (Vicky Isley and Paul Smith) and Stephen Vitiello. Sustained interest in net.art has promoted a "live" archive where these works are available to the public in a continuing tension between past and present.

The display of net-based art on computers scattered throughout the museum is "barbarian" [5] in the classical Greek sense to identify people alien to Greek culture and unable to speak that language, litterally "stammerer". Here – and also as regards the Museum's section dedicated to net.art – the intention has never been one of "display", even if the media have often claimed this to be the case. Rather, such displays are intended to act as a mode of "live documentation" to capture the interest of both the audience and of the institution itself.

With regard to the net.art section, the delivery of online works on the computer screen is now ready to shift into another, perhaps exclusively online, mode. This also takes into account the Museum's new space and audience, who are not only much broader and more heterogeneous, but also much more easily "distracted" from content, and "attracted" by Hadid's powerful architecture.

Conclusions

The above shows that NETinSPACE is located in between spaces, in between art genres, at the edge of research, and on the borderline between the unconventional and the institutional. Location – or rather, dis-location – metaphorically reflects an art form that is everywhere and nowhere, involving all departments and disciplines. Also, "net" does not exclusively refer to the internet but applies to art that manifests itself in a web of convergence of the virtual and physical dimensions.

The museum has played a dual role in embracing this project, both as the unconventional host of net.art, a process which uproots this art form from its context, and as an active participant in the production of conventional and experimental works conceived for and adapted to the museum space.

Adding site-specific installations has also turned the "interpreter" curator into more of a "mediator" between artists and institution. The presentation of net.art works alongside site-specific installations frames these art practices in a broader art scenario.

Like most unconventional art, Net.art has undergone a number of shifts, many of them determined by its move into the mainstream art system. For some artists this institutional acceptance has opened up new modes of production, encouraging them to conceive their works in formats that, while far removed from the dynamics and modes of involvement dictated by the internet, may better suit the institution in terms of its mission, gallery space and audience. Also, some artists have "translated" their works onto new supports in order to cater for the tastes and needs of this particular audience. The online works shown on the computers at MAXXI have been part of the "live" hypertext archive that has explored works created exclusively for the internet and more strictly associated with the original meaning of net.art.

 Mostly, when operating within large art institutions, the curator has to adopt a certain accepted terminology to communicate with the general public. However, neither umbrella terms such as net.art – nor the broader term "new media art" – will ever completely fit art practices that are not only multidisciplinary in nature, but "alive" and in continuous flux. Repeated – if occasionally critical – usage in a now vast body of literature has nevertheless established a certain vocabulary. Narrower terms such as " interactivity", "connectivity" and "computability," [6] which Steve Dietz uses to illustrate new media behaviour, can therefore improve the understanding of what the umbrella terms refer to.

The decision to use these terms in a field relatively new to museums was as much dictated by practical issues as by necessities of art theory. In regard to NETinSPACE, presenting online art using the term "net.art" has had a dual objective: on the one hand, as has been mentioned above, to place net.art in a broader context; on the other hand, to continue building the "active" archive that keeps alive the names and categories that designate certain art practices associated with a certain period, some of which may continue to evolve, albeit in a greatly changed context.

This is one of many reasons why "providing context" will always be important when dealing with new-media art – not least to give researchers, curators, and future conservators some points of reference. Ever since art dissolved into a "gaseous state", documentation has proved to be an even more important and inevitable curatorial activity than ever before, and it is the very first step towards conservation and archiving.

 As Charlie Gere states in an essay published on the Tate website, "what we choose to archive and thus to preserve for future generations will help determine the future." [7]

This is NETinSPACE's new, intense work being carried out in close collaboration with "MAXXI B.A.S.E", the museum's research centre.

References and Notes:

1. *Christiane Paul, "Challenges for a Ubiquitous Museum: From the White Cube to the Black Box and Beyond," in New Media in the White Cube and Beyond, ed. Christiane Paul, 74 (Berkeley, LA: University of California Press, 2008).*
2. *Yves Michaud, L'Art à l'État Gazeux: Essai sur le Triomphe de l'Esthétique(Paris: Editions Stock, 2003).*
3. *Beryl Graham and Sarah Cook, Rethinking Curating. Art after New Media(Cambridge, MA: The MIT Press, 2010), 185*
4. *Miltos Manetas, In My Computer (Brescia: Link Editions, 2011), 73.*
5. *Domenico Quaranta, Media, New Media, Post Media (Milano: Postmedia, 2010), 142.*
6. *Steve Dietz, "Why Have There Been No Great Net Artists?", Neme's official Web Site, http://www.neme.org/82/why-have-there-been-no-great-net-artists (accessed July 3, 2011).*
7. *Charlie Gere, "New Media Art and the Gallery in the Digital Age," Tate's official Web Site, 2004, http://www.tate.org.uk/research/tateresearch/tatepapers/04autumn/gere.htm (accessed July 3, 2011).*

LABORERS OF LOVE/LOL: BEHIND THE SCENES

Stephanie Rothenberg & Jeff Crouse

In the past 10 years the porn industry has experienced its most dramatic shifts in profit, production and product due to the advent of Web 2.0 and mobile devices. "Laborers of Love/LOL" examines these changes through the creation of an adult entertainment website that outsources customers' fantasies to anonymous online workers.

Be it a robotic dildo or an early adopter to Video On Demand, the porn industry has always been a leader in the development and incorporation of new technologies into the production and distribution of its products. Yet in the past 10 years the porn industry has experienced its most dramatic shifts in profit, production and product due to the advent of Web 2.0 and mobile devices. "Laborers of Love/LOL", an online artwork I co-developed with artists Jeffrey Crouse and Micheal Schieben examines these changes through the creation of an adult entertainment website. The website outsources customers' fantasies to a pool of anonymous online workers seeking temporary jobs through Mechanical Turk, a crowdsourcing job engine created by Amazon. Com. The final product is a short recombinant video, a mashup, where 1970's experimental cinema meets canned Photoshop filters, and ultimately reflects on how desire and pleasure are represented, fragmented and abstracted through the consumption of online digital media.

1. Profit: The Pirates of Pornzance

Pirates XXX was released on DVD by the leading Adult Film Company, Digital Playground, in 2005, three years after Johnny Depp's pirate film. Featuring porn star Jesse Jane it was the most expensive pornographic movie ever made with a budget of over $1 million. It was also one of the first adult videos to be made in High Definition DVD. It won a record-breaking eleven awards, including Best All-Girl Sex Scene, at the AVN Awards–the porn world's Oscars.

Yet five years later at the 2010 Adult Entertainment Expo in Las Vegas, the biggest annual gathering of the adult film industry, the event was shrunk down from two floors to one with so many less fans, foot traffic, and exhibitors you could lie down on the floor and take a quick catnap. Even the AVN Awards had been moved from the city arena to the few-thousand-seats theater at the Palms.

So what has happened to the $13 billion dollar porn industry? Pirates! Similar to what the music industry experienced in early 2000, the introduction of digital formats in conjunction with the weak economy has led to severe financial pains. The news site CNBC reported DVD sales down as much as 50% in 2009.

In reference to illegal downloading and "Tube" sites like YouPorn, Steve Javors, editor in chief of XBIZ, a major porn industry trade mag, exclaimed "How can you compete with free?"1

Porn is now also competing with online games like World of Warcraft. An anonymous porn webmaster stated "It is all entertainment that you are getting involved in … [video] games are competition for porn. Fans jerk off to porn and are done, but you can keep playing a game."2

1. **Production: We Are All Sex Workers**

Last year in an article in the Daily Beast, Pete Housley, developer of Porn Star Tweet, a service that verifies and aggregates porn stars on Twitter, said "People used to be ashamed to say their girlfriends did porn. That is gone. Anyone can afford a Web site now."3 Whether it's the girl or boy next door making their own porn site or celebrities making porn flicks such as the infamous Paris Hilton, the gap between mainstream media and adult entertaining is shrinking.

User-generated porn, or Porn 2.0 as it is called, is being enabled by web sites like Xtube, Pornhub or YouPorn–free pornographic video sharing sites similar in format to YouTube. The New York Times calls sites such as YouPorn "a good role model for the sexually naïve" since many of the homemade videos depict amateur couples having ordinary sex in contrast to the unreal scenarios of commercial porn.4 Regina Lynn, sex columnist for Wired magazine, says "Despite social and professional stigmas, a lot of people are putting themselves on the internet. It fits into this era of people expressing themselves."5

An example is Antoinette, a 25 yr old college educated interior designer from Baltimore, MD. A few times a month she and her boyfriend make "amateur" pornographic movies in their apartment under the name "Sexy Secret". Antoinette claims she does not want to be a porn star and considers herself "a pretty normal woman" saying "… I'm nice looking, sure, but otherwise I'm pretty average."6 Yet, this "couple next door" makes films with explicit displays of hardcore intercourse that would garner a XXX billing–and their 20 minutes of "work" in the bedroom earns them an extra $500 to $600 a month.7

In addition, the use of social media such as Twitter and Facebook has had a humanizing effect further mainstreaming the industry by enabling porn makers to directly engage with their audience.

But making videos and conversing with fans through social media is just one aspect of the shifting role of the sex worker. One can remain anonymous and still contribute their labor. Online temporary job agencies such as Mechanical Turk, enable anyone to make porn. By responding to HITS, what Mechanical

Turk calls "Human Intelligence Tasks", an online "worker" can make anywhere from a few cents to several dollars for finding specific images or videos through online searches. The faster you work, i.e. the more HITS you respond to, leads to higher earnings. This anonymous, outsourced distributed global labor is the mode of production "Laborers of Love/LOL" uses to create its product.

2. **Product: The Medium is the Massage**

•Approximately 45% of North Americans and Europeans are viewing media on their mobile devices8

•internet users are shown approximately 1.1 trillion advertisements per year with Facebook webpages taking the lead9

• on average Americans view 3,000 advertisement per day10

•Every second approximately 30,000 people are viewing porn11

•The average online porn flick is 5 minutes long12

•The average time it takes to reach an orgasm while masturbating is between 2-4 minutes13

• average view time on a web page is 33 seconds14

In Linda Williams renowned anthology "Porn Studies", a collection of academic essays on pornography as a cultural form published in 2004, writer/curator Franklin Melendez investigates the relationship between technology and sexuality. In examining the phenomena of video and the advent of the VCR as a new format, he explores the relationship of the convulsing body to the convulsing machine. With references to Jean Baudrillard and Frederic Jameson, he explains how the mechanical apparatus used to construct the image becomes as vital to the experience of pleasure as the sexual event itself in what he calls an "eroticization of mediation" or the "image's commodity texture".15 The material conditions such as the techniques and editing strategies used to construct the video (timing, repetition, special effects) as well as the platform, in his case the TV and the VCR are all critical to creating sexual truth in the scene.

Referencing Jonathan Crary's theory of the carnal density of vision, Melendez states that in watching pornography on the screen we experience two types of pleasure– "the possessing or consuming of the image through a disembodied gaze that operates in conjunction with corporealized vision–the pleasure of pornography's physical effects on the body".16 This relationship of disembodied/embodied then point to the significance of the viewer's encounter with historically specific modes of reproduction. Thus the "performers bodies and the television screen start to question priority of content over medium."17

If we now fast-forward to the world of Web 2.0 and mobile devices, short format wins hands-down. The byte, b-y-t-e as well as the bite, b-i-t-e as experienced on our slick sexy shrinking machines are what's relevant here. In a global culture oversaturated with information, the viewing experience has shifted. Our sight has been subjugated to the media sphere and we see the world in 33-second intervals or less–the time it takes to scan a web page or watch a TV commercial. Through this hyper fragmentation of our vision, a new cultural form has emerged–the mashup. "Laborers of Love/LOL" utilizes the mashup to provide the ultimate in sexual pleasure and fantasy in the age of digital culture.

A demo of "Laborers of Love/LOL" is available online at: http://vimeo.com/17837725

References and Notes:

1.www.thedailybeast.com/articles/2010/01/10/top-5-reasons-porn-for-profit-is-dying.html

2.Ibid

3.Ibid

4.en.wikipedia.org/wiki/YouPorn

5.www.guardian.co.uk/world/2007/dec/16/film.usa

6. abcnews.go.com/Business/SmallBiz/story?id=4151592&page=1

7.Ibid

8. mobithinking.com

9. blog.gossimer.com/web-users-are-exposed-to-1-1-trillion-display-ads/

10. www.hhcc.com/blog/2007/11/the-elusive-advertising-clutter/

*11. beautyfromashes.org/contentpages.aspx?parentnavigationid=298&
viewcontentpageguid=4cda8536-69d2-45cb-bbd4-6955e9432e0c*

12. Ibid 1

*13. brown.edu/Student_Services/Health_Services/Health_Education/sexual_health/sexuality/female_
orgasm.php*

14. www.cbsnews.com/stories/2009/05/24/opinion/main5037448.shtml

*15.Franklin Melendez, "Video Pornography, Video Pleasure and the Return of the Sublime," in Porn Stud-
ies (London: Duke University Press, 2004), 401–427.*

16.Ibid

17.Ibid

AESTHETIC 3D RENDERING OF HISTORIC SHIPWRECKS (AN ARTIST'S INTERVENTION IN MARITIME ARCHAEOLOGY)

Chris Rowland

Evidence of our maritime heritage can be found in the thousands of historic shipwrecks that lie beneath the oceans around our coastline. Developments in sonar technology have provided opportunities for high-resolution data to be gathered which can be used to produce accurate 3D images of these important shipwreck sites. This paper describes how an aesthetic approach to visualising data can make our submerged maritime heritage more accessible.
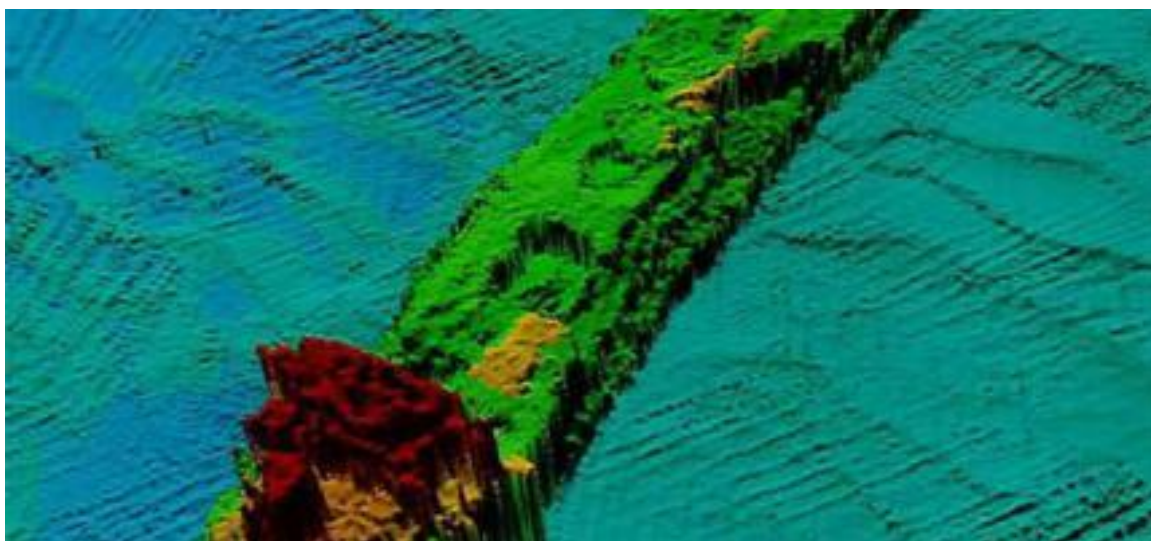
Fig 1. Sonar image of MV California. Copyright C Rowland/ADUS.
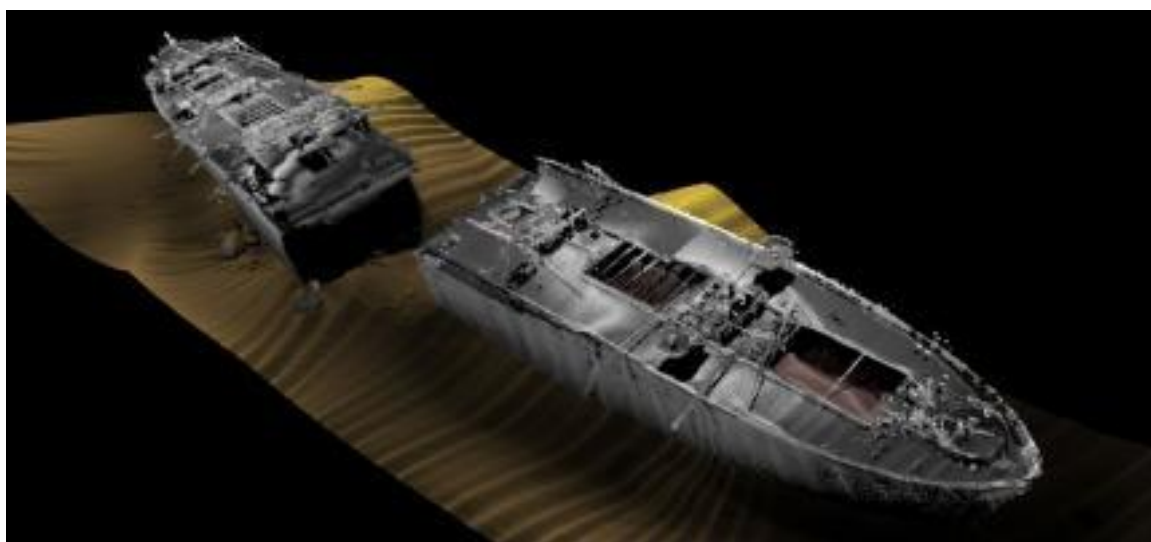
Fig 2. 3D Visualisation of the wreck of SS Richard Montgomery using occlusion objects and locoramps. Copyright C Rowland/ADUS.
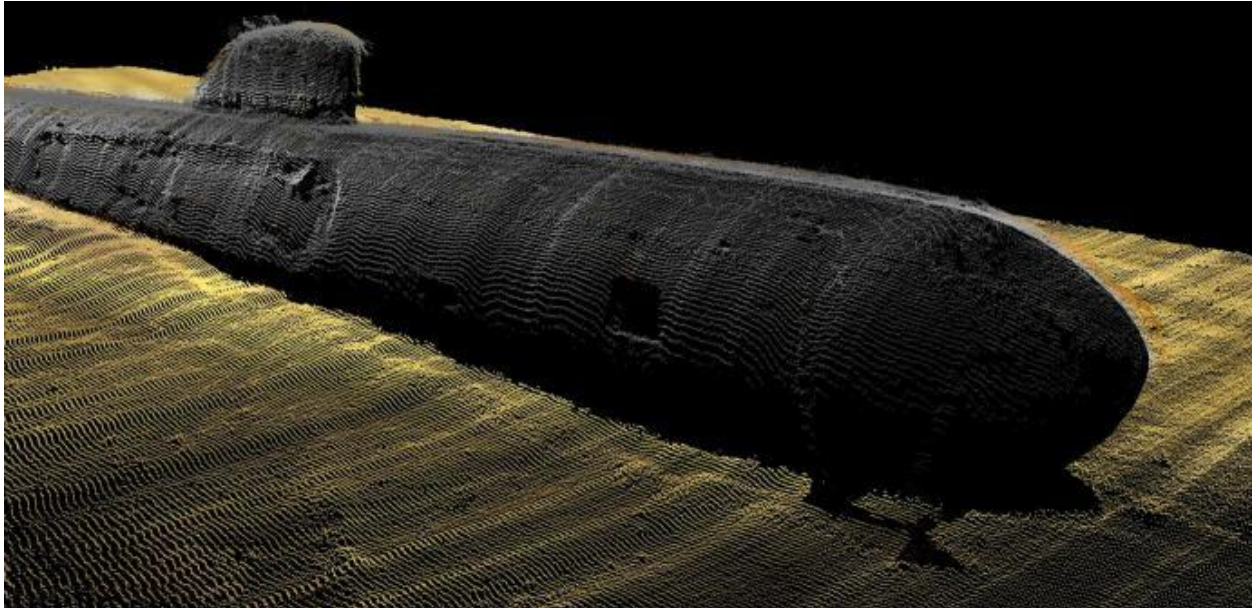
Fig 3. B159 at 250m in the Barents Sea. Copyright C Rowland/ADUS.

Background

There are 62 maritime heritage sites around the UK coast that are designated as historically and environmentally significant under the Protection of Wrecks Act (1973). English Heritage, Cadw and Historic Scotland manage the wrecks on behalf of Her Majesty's Government. The wrecks range from the remains the *Stirling Castle*, a flagship of Samuel Pepys' navy, [1] which sank in 1703 on Goodwin Sands in Kent, to the remains of the WWI German High Seas Fleet scuttled at Scapa Flow, Orkney in 1919. [2]

Designated sites are identified as being likely to contain the remains of a vessel, or its contents, which are of historical, artistic or archaeological importance. Due to the fact that all of these sites are submerged, they are effectively invisible to the general public and the majority of specialist researchers (hydrographers, historians, artists etc). Interest in shipwreck sites is not limited to their cultural or historic significance. Environmental factors are also important.

Marine salvage is carried out when a shipwreck may be a danger to shipping or the environment. When hazardous cargo (e.g. munitions or oil) create an environmental threat, salvage teams are engaged to assess the risk then carry out procedures to minimize the impact. The UK Ministry of Defence is responsible for approximately 20,000 known military wrecks around the world, many of which present such a threat to the environment. [3]

Visualising the Problem

To manage the environmental threat, there is a requirement to monitor the condition of the wrecks as they deteriorate. Surveys of the wrecks are regularly undertaken. Traditionally, maritime archaeologists have used photography, video and drawings to record the condition of important wrecks. However this

is time consuming, hazardous (due to the risks inherent in repetitive diving) and limited to shallow sites where visibility is good.

When visibility is bad or the sites too deep for diving operations, the method of choice has become multibeam sonar. This method uses sound to produce high definition 3D images of objects on the seabed much more quickly and accurately than traditional analogue methods. [4] However, multibeam sonar does not collect colour information from the targeted shipwreck, therefore colour has to be added later in order to visualise the data. The resulting dataset takes the form of a point cloud, i.e. millions of xyz co-ordinates representing the shape of the wreck as the beams of sound reflect from its surface back to the sonar device.

Industry Standard Visualisation Methods

The standard methods of visualizing such point clouds include converting them into simplified polygon surfaces. This has the advantage of preventing the viewer from seeing through the gaps between the points. The main problem with this method is the draped polygon surface also hides detail that was otherwise visible in the original data. This method is fine when visualizing large areas of seabed e.g. prior to laying sub-sea pipelines. However, when surveying environmentally hazardous shipwrecks, important information is often visible in the fine detail. For example, a polygon mesh will hide cracks in the ship's hull or holes in the deck structure, which may indicate how the wreck is deteriorating.

The Ubiquitous Rainbow Ramp

The lack of colour in the point cloud data is most often resolved by the application of a colour ramp that ranges from dark blue to red. In maritime archaeology and sub-sea salvage the colour is used to indicate depth, i.e. blue is applied to the deepest part of the wreck and red to the shallowest. Figure1. However there is no accepted standard use of colour, it can vary considerably from wreck to wreck. The use of "rainbow" colour ramps is not contained to this type of survey data. Aesthetic considerations in the presentation of scientific data are mainly found in the field of visual analytics where large abstract datasets need to be presented in visual form to promote visual interpretation and pattern detection. As Eduard Tufte describes in The Visual Display of Quantative Information: [5]

"Colour often generates graphical puzzles. Despite our experiences with the spectrum in science textbooks and rainbows, the mind's eye does not readily give a visual ordering to colours, except possibly for red to reflect higher values than other colours."

Theory of Data Graphics, p. 154.

Tufte goes on to describe a method for colouring data as used by L. L. Vauthier, [6] called the mountain-to-the-sea method. White is used to represent greater intensity since it was the colour of snow on a mountain, next came green, representing forests farther down the slopes, yellow for the grain in the fields then minimum values were coloured blue, the colour of the sea.

Examples of the ubiquitous rainbow ramp approach repeatedly appear in the visualisation of a wide range of scientific data. A simple web image search will bring page after page of rainbow coloured scientific images whether it's geospatial visualisation from geological survey data, Golevka asteroid explosion

simulations, telemetry from the McClaren Formula one racing team or isosurface normals from the Visual Human Project (to name but a few).

We are presented with these coloured scientific images repeatedly to the point where we don't really question them. Maybe the rainbow colours convince us that they are scientifically generated and therefore are likely to be true? We simply accept their validity. Unfortunately, this method of colouring data has limited benefit when visualising hazardous shipwrecks on the seabed.

An Aesthetic Approach

Working in collaboration with maritime archaeologists Martin Dean and Mark Lawrence at the University of St Andrews, it became clear to the author that the aesthetics of presenting shipwreck data followed a standard approach that did little to reveal the details necessary to understand the condition of the wrecks. Dean and Lawrence had carried out extensive research trials in gathering ultra-high resolution multibeam data from important shipwrecks around the UK. [7] In doing so the team realised that the standard methods where not sufficient and a novel visualisation approach was needed to display the level of detail that could now be gathered from shipwrecks.

The first step in attaining this was to stick with the original point cloud data and reject any form of converting the data into polygon surfaces. If data was incomplete, then it should be portrayed as such and not disguised by any meshing technique. Therefore a new method was required to prevent the viewer from seeing through the gaps between the points. An alternative to the use of rainbow colour ramps, which applied arbitrary colours to data defined by depth, could also be investigated. Finally, the use of digital cinematography offered opportunities to explore how visual depth cues could be enhanced by moving virtual cameras around the shipwreck visualisation.

Occlusion objects were developed as an alternative method to the use of polygon draping and locally oriented colour ramps (Locoramps) were created to replace the use of rainbow colour ramps. Both of these methods are described in detail in prior publications, [8] so will simply be summarized here: Occlusion objects are a solution to the gaps between points problem. They consist of 3D polygon shapes modelled to follow the topology of the wreck data. The occlusion object acts as a mask to prevent the viewer from seeing points on the opposite side of the wreck dataset by its placement in the interior of the point cloud shape.

Locoramps are used to highlight fine detail in the data by the placement of locally considered colour (or greyscale) ramps which are aligned to specific details on the wreck. Structural details are often difficult to see with the use of brightly coloured rainbow ramps often used in data visualisation; locoramps offer an alternative method for adding local colour that can be oriented in different directions.

When both of these methods are used in conjunction, the resulting 3D visualisation reveals the high detail level of the original data by applying aesthetically considered and sensitively positioned colour that emphasizes important details of the wreck's structure.

Case Study Examples

The most effective way to demonstrate the novel visualisation methods is to describe how they how have been deployed in real world situations. Figure 3 shows both methods employed in the 3D visualisation of the wreck of the *SS Richard Montgomery*, which lies in the Thames estuary. The wreck still contains 1.4 megatons of unexploded munitions approximately 400 metres from the main shipping lane and is considered to be a significant hazard to the local environment. As one of the UK designated shipwrecks mentioned earlier, the wreck is the responsibility of the UK Government and is regularly surveyed to monitor its deteriorating condition.

The tidal water around the wreck is very low visibility due to silt deposits therefore multibeam surveys and 3D visualisation are the only reliable and accurate methods of managing the site. The 3D visualisation that we produced clearly showed the damage to the wreck caused by long term submersion. Cracks along the decks and the sides of the hull were able to be measured due to the centimetric accuracy of the data. By using locoramps, it was possible to reveal high levels of detail on the decks and differentiate between seabed and debris. The wreck's proximity to the local power station, oil and gas terminal and residential housing suggest that careful monitoring of its deterioration in the long term is of significant interest.

Following the *SS Richard Montgomery* project, NATO commissioned the team to survey and visualisation of a sunken nuclear submarine in the Barents Sea near Murmansk. The *B159* was a November Class Russian submarine that foundered and sank when under tow for decommissioning in the Arctic Circle. Of the ten crewmen on board, only one survived the sinking and two bodies were recovered. The remaining seven bodies are thought to be still on board the wreck alongside 800 kilograms of spent nuclear fuel with a radioactivity level of 750 curies per kilo [9] at 250 metres below sea level. The survey successfully gathered multibeam sonar data from the submarine wreck. The resulting 3D visualisation showed the submarine sitting upright on the seabed with a six metre section of its stern missing. Figure 3.

The final 3D visualisation shows the wreck on a pitted seabed with two of the floatation pontoons nearby. Damage to the hull of the vessel is clearly visible along the sides of the hull, suggesting considerable impact from the floats as the submarine sank. In the wider area it is possible to see crater like deformations in the seabed. These were initially considered to be damage from cold war depth charges. However, these features can also be found in areas of UK waters where there is no history of depth charge use. It is therefore most likely that they are caused by gas emissions through the seabed sediment. The survey and subsequent visualisation allowed some conclusions to be drawn which otherwise would have been difficult to surmise, bearing in mind that the depth of the site is 250m and beyond safe diving limits, optical methods of examining the area would be extremely difficult.

"Towards the stern of the wreck, raised sediment ridges are apparent on both sides of the hull. This is evidence that the submarine impacted the seabed stern first then rotated forwards along the keel line, possibly breaking of the stern section under the sediment. The survey data shows no discernable major distortion of the hull although specific damage to parts of the outer casing is evident. This implies that the internal pressure hull will be in reasonably sound condition. If further surveys prove to be the case, it is possible that the vessel could be lifted in one piece."

Martin Dean, B159 Survey report for the Ministry for Defence.

Accurate and easily understandable representation of the data is important to inform site management and potential recovery of the radioactive elements. These steps forward in visualising the data hope to enhance this understanding.

Real World Applications

Other applications of our visualisation methods have been commissioned by commercial salvage companies (e.g. Titan, Mammoet) to examine recently sunken wrecks in shipping routes around the world. The team surveyed and visualised the sunken wreck of the oil rig *Deepwater Horizon* in the Gulf of Mexico in March 2011 following the explosion and sinking that caused the biggest oil spill in USA history. The resulting 3D images are being used to help identify potential causes of the disaster as well as the rig's current condition on the seabed at a depth of 1,500 metres.

The visualisation methods are also in use in heritage applications: twenty wrecks off the coast of North Carolina, USA have been surveyed and visualised for the National Oceanic and Atmospheric Administration (NOAA see: http://desne.ws/nj0qwR). The intention is to produce 3D images of ships that were involved in the Battle of the Atlantic in WWII that will be accessable to a public audience who otherwise have no access to these sites.

Summary

Our approach to visualising sonar data of hazardous or historically important shipwrecks is differentiated from traditional methods through the aesthetic approach that we have taken. The industry standard rainbow ramp approach is useful to show threshold values in some forms of data but in this field it can distract the viewer from understanding what they are seeing. Approaching the problem from a design perspective, and constantly asking the question: *"How can this image be improved?"*, we open up the opportunity for alternative visual thinking. Artists and designers can offer an alternate approach to visual communication, tacit knowledge gained through creative practice is the starting point.

Images of the *B159* survey and other projects mentioned can be viewed at
http://www.adusdeepocean.com/

References and Notes:

1. J. Curtis, *Shipwreck of the Stirling Castle* (Whitefish, MT: Kessinger Publishing, 2006).
2. D. Van der Vat, *The Grand Scuttle: Sinking of the German Fleet at Scapa Flow 1919* (Edinburgh: Birlinn, 2007).
3. Sarah Dromgoole, "Military Remains Around the Coast of the UK: Statutory Mechanisms of Protection," in *International Journal of Marine and Coastal Law* 11, no. 1 (2006).
4. Martin Dean, Mark Lawrence, Richard Bates et al., "RASSE Report (Project Number 3837)," English Heritage, January 17, 2007, http://www.st-andrews.ac.uk/rasse/library/pdfs/rassefinal.pdf (accessed July 3, 2011).
5. Eduard Tufte, *The Visual Display of Quantitative Information* (Cheshire, CT: Graphics Press, 1996), 54.
6. H. G. Funkhauser, *Historical Development of Graphical Representation of Statistical Data* (London: St Catherine Press, 1937).
7. Martin Dean, Mark Lawrence and Richard Bates, "Factors that Influence the Quality of Archaeological Multibeam Sonar Surveys" (paper presented at the conference on Historical and Underwater Archaeology, Sacramento, CA, January 11-15, 2006).
8. Chris Rowland and John Anderson, "WreckSight: Revealing our Submerged Maritime Heritage," in *VAST 2010: The 11th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage*, eds. Alessandro Artussi et al. (Paris: Eurographics, 2010).
9. Bellona, "Northern Fleet Accidents and Incidents," Bellona's official Web Site, http://www.bellona.org/subjects/1140451820.2 (accessed July 3, 2011).

DIGITAL PAINT TO DIGITAL PHOTOGRAPHY: THE LONG REACH OF ABSTRACT EXPRESSIONISM

Cynthia-Beth Rubin

Passionate experiments in the interaction of color gave rise to the Abstract Expressionist movement of the 1960s, in which spatial ambiguity ruled above all else. As an early digital artist coming from Painting, this language of abstraction is so pervasive in my thinking that nothing can purge it from my visual vocabulary, even when I move into uncharted territories of meaning derived from mixing real world photographic and "painted" imagery.
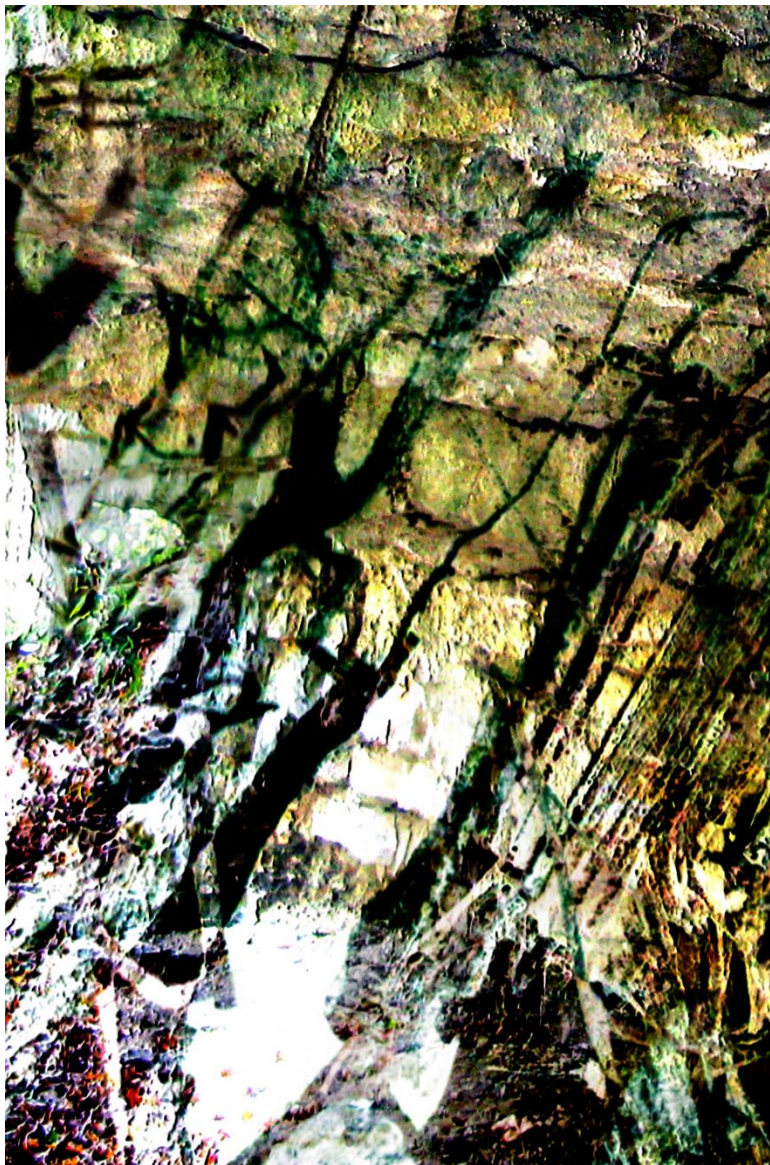
Rocks and Trees in the Glen: State IV.

The tension between abstraction and representation has haunted much of the discourse of art over the last century. Passionate experiments in the interaction of color gave rise to the Abstract Expressionist movement of the 1960s, in which spatial ambiguity ruled above all else. Rooted in the explorations of the Bauhaus artists, the concept that an artist can create meaning out of engagement with the formal compositional elements of art, with or without representational content was and remains appealing.

As an artist who embraced digital imaging precisely because it promoted a new visual vocabulary, this is a memoir of my enchantment with the computer as the medium for creating meaning through explorations of composition. Writing code never appealed to me, but the early computer software/hardware configurations developed for artists pulled me in right away. I wanted repetition, I wanted distortion, I wanted parts of my imagery to serve as commentary to other parts of my image.

Beginnings in Abstract Painting

There is no avoiding that the Abstract Expressionists informed the early careers of many of us in the digital media field, leading us to create imagery that obscured any representational content. Although many cite the mess of oil paint and the traces of the artist's brush strokes as the core of Expressionism, for myself, it was the compositional tensions of color, texture, and gesture that enchanted and propelled me forward in my artistic investigations. Abstract Expressionism promised irresistible magic, and I did not resist. We believed that this was a purer art form, that the communications were more significant and subtly complex than simple representation. The readable qualities of the imagery served as a distraction from this magic.

I began my career as an abstract or nearly abstract painter, working with layering of gesture and forms with the goal of teasing out a dynamic image on the still canvas. In the digital art world of today, where moving image is so pervasive, we think of paintings as frozen, but for those of us immersed in abstraction these were moving images, visually unfoldeding over time, despite their physical attributes.

Although it seemed absurd to hide the sources of the natural sources for the shapes of color and textures in my painting, these forms had little meaning in themselves. Flowers became dancing forms, seedpods became glyph-like elements completely removed from their source. Showing the sources would have slowed down the reading of the canvas.

Early Digital Art

I began painting into the computer in 1984, at a time when in my physical painting I was already cutting stencils for forms, so that I could easily repeat them. Additionally, I was exploring innovative compositions by visually dividing my canvases with masks, and then playing with the resulting unexpected juxtapositions.

As early digital artists, using the first dedicated software/hardware systems, we input imagery by drawing directly on digitizing tablets, as scanning was barely readable, and prohibitively expensive. Using existing configurations in the days before "off the shelf software," we could essentially only modify the color of these drawings, repeat them, change scale, and repeat again. These early limitations made the transition from painting all the more natural and alluring for those of us who were more fascinated by formal explorations of the compositional tensions of visual art than with its story telling potential.

Oddly, in those early days, it was no longer necessary to hide the source of our digital drawings. The novelty of the medium, and the lack of expectation that "the computer" could produce anything realist, was enough to free viewers to experience the abstract, lyrical qualities of the imagery even when the evidence of the sources showed through, as in my early series based on forms from flowers. In reviewing a 1987 exhibition that included both my paintings and computer works, Bill Zimmer wrote for the New York Times that the paintings were "pleasant but ordinary" while the computer images presented a breakthrough, even though they represented similar compositional investigations. In painting, representation, especially of flowers, was regressive. In digital work, everything was, in 1987, progressive. [2]

Readable Imagery and Abstract Thinking: My Personal Big Bang

This assessment of digital work as exciting despite the obvious inclusion of readable imagery no doubt fed into what became my own "Big Bang." In 1988 I was working with the motifs of medieval Hebrew manuscripts in my then exclusively digital work. I turned to these sources for compositional inspiration as I searched for ways to break out of the traditions of typical European painting. One day I realized that the decorative motifs of these manuscripts echoed the decorative and architectural motifs of the places where they were created. This discovery set me off to make works about "place", about specific sites, digitally interweaving photographic elements that gave the impression of "place" without direct representation.

As I wrote in 2007: My first series on the Marseilles Bible. . . . was a celebration of the decorative motifs with little readable reference beyond flowers and other natural forms. The motifs set the context for the imagery, encircling it, pushing against it, holding it back. The images from this time are clearly two seemingly opposite references brought together: historical structures and flowing, colorful forms. [3]

Once liberated to create work about place, the pieces slowly evolved to interweave pictorial references, changing as the technology developed. Shunning direct digital photography, I "painted" with image fragments, layering them together in a dialogue of compositional tension that continued to spring from the tradition of Abstract Expressionism.

One can hardly refer to these works as representational, and yet they do present and describe. Often referring to sites of cultural heritage, these images bring historical realities to the viewer in a mediated form, providing a portal to an imagined past or other places outside of personal experience..

Conclusion: Unexpected Return to Drawing

Over the last few years, I have been collaborating with my younger self, interweaving scans of my pen and ink drawings from over 40 years ago with recent digital photographs of the same locations. The mixing of gestures of a young artist with the newer medium of digital photography gives fresh meaning to the space between levels of representation and interpretation.

Suddenly, after years of resisting the "natural media" that imitate paint, I found myself in the right situation to seriously experiment with digital paint. I was recently an invited artist in residence in Arles-sur-Tech in the French Pyrenees, and the natural beauty of the location and the emotionally moving remnants of the medieval city stirred me to simply draw. These drawings in turn were mixed with photographs.

Why is this the Big Bang of Electronic Art? Because while the world is looking at the technology behind the image, the real innovation is in the imagery itself. It is the ability to move from painterly gestures to photographic and back.

The boundaries are gone, and only the visual is left. The medium no longer matters. The image has won out.

References and Notes:

1. Hans Hoffmann, "Search for Real in the Visual Arts," in Search for the Real, eds. Sara T. Weeks and Bartlett H. Hayes (Cambridge, MA: The MIT Press, 1967).
2. Bill Zimmer, "Winners' Works in Hartford," The New York Times, February 22, 1987.
3. C. B. Rubin, "Notes from the Decorative Zone: Embellishment and Meaning in Jewish Art," Proceedings of Conney Conference on Jewish Art, Madison, Wisconsin, (2007).

FEEDBACK AS SELF-PERFORMANCE

Steve Rushton

Media-activists of the 60s and 70s (Ant Farm) presented the possibility of autonomy through media. Although now realized through platforms such as Twitter and Facebook, self-performance is of a different character than the one envisioned by the media guerrillas of the past. Feedback loops of non-scripted TV serves as an aid to political reasoning promoting a culture of entrepreneurism, privatisation, volunteerism, and responsibilisation.

The August 28, 2008 issue of Time magazine shows an image of a man who has been caught up in a dispute between drugs gangs in Mexico. He is lying dead in the street, surrounded by a group of onlookers. What makes this a very contemporary image is that the bystanders are taking photos of the man's body with a variety of devices (video, digital, phone cameras). In fact, the people in the picture who are taking a photo of the body almost outnumber those who are not.

Making sense of the economy of such an image requires an understanding of a piece of information (in this instance a photograph) as a unit of exchange in which our attention, and the attention of others, is accorded value. We do not know what happened with those pictures of the dead Mexican, but some may have been posted on the Internet to become units of exchange on blogs, on-line communities and chat lines. We ourselves are involved in an information economy every time we log on to Facebook or send an e-mail, wherever the circulation of information increases our visibility. The economy of such an image is founded on our activity as self-performing subjects, feeding back and exchanging information in order to improve our stake within this economy.

This edict to perform has become a foundational part of the structure of contemporary media, in which TV shows stitch together handy-cam footage of hapless viewers bumping into lampposts or falling off ladders, while amateur videos of natural disasters and terrorist attacks provide the 'authentic image' to the aesthetic of print and TV news. Everyday Joes and Janes confess all, undergo extreme makeovers, have their rides pimped, have their homes refurbished, have their children reconditioned, have their marriages fixed, choose new partners, choose new wallpaper, are fed by celebrity chefs, are starved by personal trainers, run the marathon, make poverty history, bungee-jump wearing a red nose and clown's shoes. In this arena of the information economy, we increasingly use media to police ourselves, maintain ourselves, judge ourselves against others, regulate our behaviour, measure ourselves and measure others. In an era in which direct government intervention is despised (I don't need handouts from Big Government!), new technologies of self-control have grown to replace this intervention, as a greater part of our lives is taken up with the 'work of watching' and the 'work of being watched.'

The reality TV show, for instance, is predicated on the idea of feedback. Indeed, one might understand the new media mix as a circuit of production that collapses the difference between producer and consumer. This has very interesting consequences economically, because although we work in order to make this type of media happen, we are paid little or no money for the work we do – in fact, in most cases we pay out of our own pocket. The profit from our work actually goes to the (TV) production companies, the phone companies and big media conglomerates, along with the media retail outlets that sell

us upgraded equipment. As a consequence of all this, we can no longer say we live in 'the society of the spectacle.' We are everything but passive consumers of products; we live in a society of self-performance in which we constantly present ourselves, and excite the interest of others in what we do; and this self-performance is a commodity that has a price. I don't think I'm straying into the realms of science fiction if I suggest that contemporary media have created a form of immediacy in which human subjectivity is the principal object of production and consumption, and in which media serve to facilitate this production and consumption. Laurie Ouellette and James Hay, in "Better Living Through Reality TV" (2008), link Foucault's idea of 'governmentality' with current liberal strategies of 'privatisation,' 'volunteerism,' 'entrepreneurism,' and 'responsibilisation' which extend media production into the realm of political reasoning. It is the regime of constant testing, perpetual visibility and self-reliance that governs and produces its subject. [1]

So the training and testing which is central to reality TV shows, along with the personal investments in the aims of the show ('this will teach me something, make me a better person'), serve to translate the negatives of travail and ruthless competition into the positives of self-improvement and personal empowerment.

The imperative to perform has been a subject of discussion for some time, of course, and has been variously described as "the experience economy" (Gilmore and Pine), "the immaterial economy" (Lazzarato), "the control society" (Deleuze), "the mode of information" (Poster), "the weightless society" (Leadbeater), "The Networked Society" (Castells), and as the engine behind "the new spirit of capitalism" (Boltanski & Chiapello). All attempt to explain the shift from a manufacturing society, which is based on physical labour and material products, to a networked society, which is based on the exchange of information. The network, or non-hierarchical 'trading zone' are, as I mentioned before, cybernetic notions, and we use them all the time to understand and 'narrativise' the world we live in. The very idea of feedback within the social network is one of those ideas that shape our world. It is inescapable; but it is possible to trace its origins, chart its effects and establish some sort of critical position.

For his part, Andrejevic insists on an understanding of capitalism as a surveillance system that grows more sophisticated as it develops. I find Andrejevic's broad stroke very convincing: since the time of the enclosure of land we have seen a "consolidation of techniques not only of monitoring workers but of centralising control over the manufacturing process." [2] So the phases are: (a.) the enclosure of land, which peaked in the middle of the eighteenth century; (b.) Taylorism in the nineteenth century (scientific management which resulted in the division of material and mental labour); (c.) Fordism in the twentieth century (subordination of the time of the workers to that of the assembly line and the 'de-naturing' of labour); and (d.) the digital age, which promises to restore time to the individual and release the wage slaves from the factory floor, etc. In fact this promise is not fulfilled, because the digital age actually represents a re-ordering of the relations between production and consumption, between 'our own time' and 'the company's time.' As we increasingly attempt to sell ourselves as a commodity, our subjecthood becomes one of perpetual presentation; and of course, we seek to find our destiny in the new subjecthood, which we are forced to invent for ourselves.

Andrejevic argues that the panopticism of modernity (surveillance through monitoring individuals in the workplace – Taylor's scientific management) has given way, through the processes of new techniques of information management, to the dual action of panopticonism (the few watching the many) and synopticonism (the many watching the few). The synoptic is the regime of the celebrity, of course.

Through the necessary exchange of data about ourselves, we are being herded into what Andrejevic calls a 'digital enclosure' in which our identities (or profiles) can be constructed, in which we can be identified as very particular consumers, and in which ultimately our own performance becomes a commodity for exchange. So the digital age essentially represents a new discipline of management relations, and perhaps it would be fair to say, a new discipline of self-management – and as the volunteerist models such as The Big Society are rolled out, a new era of political management.

The feedback loop of reality TV should be understood in this broader social and technological context, as an agent of governance. The word 'cybernetics' (the science of feedback systems) shares its etymological roots with the verb 'to govern', incidentally. It is also worth remembering that within cybernetics the 'control' of a system comes from within that system, it is not imposed from the outside.

How the TV industry understands itself in the light of this shift to self-performance is demonstrated by Chris Short, head of interactive media at Endemol UK, the producers of the reality TV franchise Big Brother. Back in 2002 he said: "We're creating a virtuous circle that excites the interactive audience about what's going on in the house, drives them toward the TV program, the TV program will drive them to the internet, the internet to the other ways they can get information, and the other ways back to the TV." [3] The non-scripted TV show is at the high end of an imperative to perform, which can be seen in any number of instances where the community is sold back to itself as a commodity.

To understand how the ontology of television has shifted during recent years, it is worth looking again at Richard Serra and Charlotta Schoolman's "Television Delivers People" (1973), which came at a time (the early to mid-1970s) when a number of artistic and critical projects suggested alternatives to the mainstream. These included TVTV (Top Value Television), Raindance, Videofreek and Ant Farm. Along with them came a new critical literature, including Michael Shamberg's seminal book "Guerrilla Television" (1971) and the magazine "Radical Software" (1970–1974), which provided a platform for critique and media activism. All combined the collectivist ideals of the 1960s with the potentially democratising (new) technologies of video, closed-circuit TV and cable. Here I would like to take a little time to investigate how these TV Guerrillas helped provide the conditions that made the current media feedback loop of self-performance possible.

Back in 1973, the TV audiences described by Serra were 'distracted' by scripted entertainment or information (news and quiz shows for instance) while advertisers smuggled messages into their consciousness. The model for the television economy (in the United States at least) traditionally worked on the principle that the networks would lease programs from production companies and take in the advertising revenue.

In contrast, Chris Short, our man from Endemol, describes a media economy in which the advertiser is no longer necessarily linked to the show's production, because the money from telephone calls and SMS text messages to the show provides at least a portion of its income. In 2005 Endemol's combined U.S. productions took money from 300 million calls and SMS messages. Also in 2005, the U.S. "American Idol" registered 500 million votes (63 million for the final) at 99 cents a pop. Although still providing a comparatively small portion of the overall budget, these methods of income generation for programmes are growing fast within the non-scripted sector of television production, with product placement – in which products are scripted into non-scripted shows – rising from a once-negligible share to 10% of the total share of the income of non-scripted U.S. programmes. Another source of income which allows production companies to compete (at increasingly tight margins) in an industry where four out of five new

shows fail, is the sale and export of formats in which the 'playbook' and the 'coach' are provided on a franchise basis (the European companies Endemol and FreemantleMedia are very successful at this). [4]

The radical change in the network-advertiser system, which served the industry for decades, is graphically illustrated by the example of the reality TV hit show "Survivor." In 2002 CBS agreed to share the advertising revenue from "Survivor" with its producer, Mark Burnett, who also agreed to pre-sell the sponsorship. Burnett secured eight advertisers who each paid $ 4 million for each show. This was a combination of product placement, commercial time and a link through the website. By contrast, the last season of "Friends," which was produced by Warner Brother for NBC, cost $ 7.5 million dollars per episode, with $6 million going to the six principal actors.

"Survivor" wasn't only cheap to produce (a reality TV show cost $ 700,000 – $ 1,250,000 per hour at the time) and effective at generating advertisement revenue, it was also popular, even outperforming NBC's highly popular and hugely expensive "E.R." in ad revenue. The success of the new model represented a tipping point for the broadcasters, and by 2005 20% of primetime programme hours consisted of non-scripted content. This 'Wild West' of television is funded through an increasingly diverse mix of sources, from SMS to product placement and online advertising through web sites that feed into the TV show. Furthermore, increasingly sophisticated techniques for analysing how effective a particular advert might be, have resulted in more diverse and sophisticated targeting strategies by advertisers; a process that will certainly be intensified and refined even further using profiling work from Google and Facebook. [5]

It's ironic that the abolition of the space between production and consumption – which we now see happening as viewers provide funds for production via phone calls to the show, as well as their on-screen and online presence while they deliberate the fate of a particular contestant – was the dream of the architects of the critical, self-initiated media that grew out of the counterculture of the 1960s. They wanted to see the end of the grip, which the networks and advertisers held over the industry. Central to this critique was the notion that in order to break the circuit of monopoly of production, it was necessary to dive into the feedback loop of self-production. Indeed, the rise of the participant – the self-performing subject – is no coincidence in an economy where visibility itself has become a commodity.

In the July 1968 supplement of the Whole Earth Catalog, Ant Farm published their text on the "Cowboy Nomad" in which they cast themselves as cybernetic cowboy prophets of the future technological revolution:
YET THERE ARE COWBOY NOMADS TODAY, LIVING IN ANOTHER LIFE STYLE AND WAITING FOR ELECTRONIC MEDIA, THAT EVERYONE KNOWS IS DOING IT, TO BLOW THE MINDS OF THE MIDDLE CLASS AMERICAN SUBERBANITE. WHILE THEY WAIT THE COWBOY NOMADS (OUTLAWS) SMOKE LOCO WEED AROUND ELECTRIC CAMPFILES. [6]

Michael Shamberg, in "Guerrilla Television" (1971) wrote about how the feedback technology of TV might be used to break the stronghold the networks and advertisers held over the minds of viewers back in the early 1970s: "[strategies] might include tactics like going out to the suburbs with video cameras and taping commuters. The playback could be in people's homes through their normal TV sets. The result might be that businessmen would see how wasted they look from buying the suburban myth." [7]

For both Ant Farm and Shamberg, the subject ready for change is 'the corporation man,' the individuals conditioned by the commodity-centred media to accept their hollow existences and to throw in their lot with the commodity. This is the endpoint of spectacular media: the message (the advert) stops when it

hits the consciousness of the consumer, who, intoxicated by the spirit of bad faith, will go forth and buy stuff.

Both Ant Farm and Shamberg understood that in order to break the hold of monopoly, it was necessary to include the viewer into the feedback loop of production: making the viewers visible to themselves would create a shift in the economic logic of the media. The understanding of TV as a feedback mechanism that could 're-form' an individual's behaviour had already been appreciated by social psychologist Stanley Milgram, who conducted the infamous "obedience to authority" experiment in 1961. Milgram was greatly influenced by Allen Funt's "Candid Camera" (perhaps the TV format closest to present-day shows). [8]

So how do we explain the schizophrenia of a radicalism that mistrusted (monopoly) technology, and a radicalism that looked to technology for the solution?

Fred Turner's book "From Counterculture to Cyberculture" distinguishes two political trends that emerged in the United States during the 1960s. These can be broadly categorised as the 'new left' and the 'counterculture'. The new left emerged from the civil rights and anti-war movements. This group understood the world as driven by the material realities of class, race and labour. The second group, the counterculture, emerged from a heady blend of beatnik literature and cybernetics, which understood individuals and systems (including ecological systems) as components of networks that exchanged information with others. In this scheme, the media could be understood as a media-ecology, the evolution of which could be redirected. Those experimenting with LSD understood the drug as a technology of the self, as a form of software that could change the program of a group or an individual.

The underlying philosophy of the network was also a major inspiration for the 700,000 individuals who set up a series of communities throughout the United States between 1967 and 1971. [9]

By the early 1970s, cybernetic ideas were axiomatic amongst the media activists who had grown through the counterculture of the 1960s; the Portapak and video represented new tools that would extend the scale of human potential, just as every other new technology had done before, while loopholes in licensing regulations (in relation to the new technology of cabal) allowed for new modes of production. As Ant Farm put it, riffing on media theorist Marshall McLuhan's idea of the global village:
HOW LONG WILL IT TAKE THE LAG
IN OUTLOOK AND CONSCIOUSNESS TO WHIPLASH
FITTING THINKING/IDEAS TO TECHNOLOGICAL CAPABILITIES. [10]

Shamberg, in "Guerrilla Television," made the radical distinction between a materialist left and a cybernetically inclined left: "True cybernetic guerrilla warfare means re-structuring communications, not capturing existing ones" [11] while Timothy Leary, championing the new technology of mind-expanding drugs, stated that "[People should]…drop out, find their own center, turn on, and above all avoid mass movements, mass leadership, mass followers." [12] The imperative for the individual to re-program (rather than for the masses to revolt) reaches its technocratic extreme with Buckminster Fuller's assertion that "revolution by design" will mean that "politics will become obsolete." [13]

During the 1960s and 70s, European media critique (grounded in Marxism) tended to emphasise the alienation engendered by the mass media – the distance between the viewer and the shining world of

the commodity. In the United States, by contrast, a network of activists, architects, artists and critics experimented with a different understanding of the medium of TV. Freed from the stranglehold of the networks, accessed by the people, TV could become a technology for 'making' reality. Groups like Ant Farm, Raindance, Radical Software and Videofreek (versed in the cybernetic lore of Norbert Wiener and Marshall McLuhan) tested the possibilities of a medium that could indeed produce a participating network, which would collapse the difference between performer and producer. What could not be easily foreseen though, was how the feedback loop of TV could turn the commodity and the commodity-performer into same thing. The feedback loop of non-scripted TV shows is where the contestant and the prize find their equivalence. It is here that the figure and ground that defined the old mass media are replaced by a constant oscillation between producer and consumer.

References and Notes:

1. Laurie Ouellette and James Hay, *Better Living Through Reality TV* (London: Blackwell Publishing, 2008).
2. Mark Andrejevic, *Reality TV, The Work of Being Watched* (Maryland: Rowman & Littlefield Publishers, 2004), 23-60.
3. Ted Magder, "Television 2.0," in *Reality TV*, eds. Susan Murry and Laurie Ouellette, 157 (New York: New York University Press, 2009).
4. Ibid., 141-152.
5. Ibid., 152-164.
6. Felicity D. Scott and Ant Farm, *Living Archive Allegorical Time Warp* (New York: Actar, Columbia Gsapp, 2008), 13.
7. David Joselit, *Feedback* (Cambridge, MA: The MIT Press, 2010), 101.
8. Anna McCarthy, "Stanley Milgram, Allen Funt and Me," in *Reality TV*, eds. Susan Murry and Laurie Ouellette, 23-44 (New York: New York University Press, 2009).
9. Fred Turner, *From Counterculture to Cyberculture* (Chicago, IL: University Of Chicago Press 2008), 81.
10. Ibid., 87.
11. Timothy Leary et al., "The Houseboat Summit," Leary.ru, http://www.leary.ru/download/leary/T.Leary,%20G.Snyder,%20A.Watts,%20A.Ginsberg%20-%20Summit.pdf (accessed June 11, 2012).
12. David Joselit, *Feedback* (Cambridge, MA: The MIT Press, 2010), 101.
13. Felicity D. Scott and Ant Farm, *Living Archive Allegorical Time Warp* (New York: Actar, Columbia Gsapp, 2008), 40.

INSECURE TERRITORIES - INTERVENTIONS IN CITY INTERFACES

Georg Russegger

Abstract

The paper reflects on artistic interventions in urban public space. By using digital-media and -devices new forms of hidden and invisible territories has been created. Mediatechnological networks such as wireless-lan or mobile phone infrastructures extend the city with complex layers of interaction and create new spaces of communication. The presentation emphasises artistic projects based on the CODED CULTURES Festival in Vienna, that are creating protocols and interaction scenarios to enter and display insecure and hidden territories in the city based on communication technologies and media-cultural structures in urban life. Public space does not end at the borders of visible, perceptible reality but extends into the invisible. The increased population of communication devices in public life results in a dense layering of electromagnetic content passing through both air and bodies, on route to its target. As such we are not just senders and recipients but carriers of signal. We unwittingly move through numerous digital and analog networks, leaving traces of our electronic passing with the devices and gadgets we carry. More so, we inadvertently leak information about ourselves that can be analyzed to a disturbing level of accuracy with publicly available forensic tools. The city in this sense stands for an interface mixing diverse layers of individual representation, orientation, presence and participation, which can be observed and traced by unknown invaders.

Background

Based on theories of Mark Weiser (1), a pioneer in the field of pervasive computing, the connection of humans and computers will be ubiquitous. Relating this understanding to the dominant living environment of humankind, the city itself becomes a core interaction hub and by this means a complex communication interface. Data is stored, up- and down- loaded onto context, embodied devices and multi-sensory environments, as Malcolm McCullough stated (2). Physical-digital Interfaces just as MEMS (Micro-Electro-Mechanical-Systems) have changed our whole relation to the surrounding devices and our interaction methods with them. Combining this media- and communication-technologies and media-architectonical developments with a global perspective of city development, how Joel Kotkin analysis, 5 billion people are living in urban environments by 2030 (3). City policies worrying about expanded landscapes, no-go areas and blind spots of transportation and maintenance have been accomplished by believing in problem solvers like new technologies and communication infrastructures. Like the Anthropologist Robert Mc C. Adams puts it: "We have accomplished an awesome technological destruction of distance" (4). Meanwhile those communication technologies intervene into urban structures; there are no municipal strategies to handle the massive individual data interference within public spaces. The security and observation paradigm, which can be seen in cities like London or Tokyo, promotes the development of hyper-networked, panoptic and multi-sensory urban mediascapes, but most of the people are unable to understand what is going on behind the interface. While in 2005 the market penetration of mobile phones in Austria added up to 106% (8.6 mil. Sim-Cards registered by 8.1 mil. inhabitants) it still grew and totals up to 146% end of 2010 (www.rtr.at) because of the additional usage of mobile internet. Moreover in 2011 a typical urban resident carries around multiple communication devices, capable of

various protocols like Wi-Fi, GMS/UMTS, Bluetooth and others, rather then having "only" a mobile tele-phone. Moving through public urban spaces, those devices leave invisible tracks and leak private infor-mation of their carriers without their knowledge and furthermore are used for commercial, user focused Data- mining as in case of Apple's hunger for location based Information. Besides the issue of being used as an unwilling part of Crowd-Sourcing campaigns of multinational companies there is a serious intimi-dation in leaking private and personal information that can be used for controlling and manipulation. In addition to that a typical user does not only send out digital information and leave his traces but also consumes, and trusts the information which is consumed on the devices. Especially on "not secured" Wi-Fi Networks, the risk of receiving manipulated Information is very high, as shown by Julian Oliver and Danja Vaillev with their Project "Newstweek" (5). There is a crucial need to raise the awareness of those invisible fields of electromagnetic communication and accept their meaningfulness as extended parts of the public sphere.

Workshop and Artistic Practice

To create a practical basis for this observations several workshops during "transmediale 2011" (6) have been organized by the CODED CULTURES Festival in cooperation with the artist running the hack-space "Weise 7" in Berlin. Within the workshop practical exercises, talks and presentation related to technolo-gies and techniques of how to read the plethora of signal in the air, manipulate it and pass it on were covered within different viewpoints on the topic of how territories in the city can be or can be made in-secure. Several strategies based on the practice of hacking and modding of devices have been applied within the workshop. Unter the title Network Insecurity Experience wireless hackers Julian Oliver and Bengt Sjolen presentsd the WiFi spectrum (2.4-2.5Ghz) as a rich material for activist intervention, study and play. In tandem with Gordo Savicic and Michal Wlodkowski, from a temporary outpost in Sao Paulo, they lifted network packet analysis and manipulation into a transcontinental domain. Under the title "In-visible Territories" Brendan Howell and Martin Howse have taken investigations and interventions into other bands of the spectrum, introducing custom hardware and rigorous techniques for a psycho-geo-physical reading of the area around the former "Tempelhof" airport in Berlin.

Conclusion

This is the time where artistic projects using the city as a laboratory, exhibition space, communication platform or hack-spaces, having good chances to try things out and develop test drives for future appli-ances. It is as well the time where open design thinking meets city development on the level of wilder-ness. Interface cultures can be developed in a prototypical sense, since only minor rules have been made and the borders and gates have not been set by profit-oriented organizations and thin innovation. It opens the fields of free development within a mainly cacophonic media-composition, lacking of struc-tural preciseness and offering opportunities for new forms to overcome limitations. Nothing the less it is a short window of opportunity to add crazy and valuable ideas on the intersection of materialized archi-tecture and its connectedness via waves, data, sensors, protocols, scripts and everything which is perva-sive without a suitable interface or device. This can be seen as a kind of vireal (real – virtual) testlabs to experiment with existing infrastructures, standards and norms of interaction. The so called »real« stands for the materialized and not for reality. The »virtual« stands for digitally and media-integrated forms of information, including digital environments and all code-based action and interaction interfaces. This

blended realm is the cognitive environment where we try things out, learn, organize, create, design and establish knowledge. The combination of architecture and media architecture in the city such as wireless networks, sensors, RIFD systems, 3G mobile-phone networks included in existing materialization of classical architecture is a basic requirement in urban development today.

References and Notes:

(1) Cf.: www.ubiq.com/hypertext/weiser/SciAmDraft3.html (last access: 20th July 2011)

(2) Digital Ground; Malcolm McCullough; The MIT Press; Cambridge, Massachusetts 2004

(3) The City; Joel Kotkin, Phenix Paperback, London 2004

(4) Contexts of Civilizational Collapse; Robert Adams; In: The Collapse of Ancient States and Civilizations, University of Arizona Press, 1988

(5) http://newstweek.com (last access: 20th July 2011)

(6) http://www.transmediale.de/content/insecure-territories?page=1 (last access: 20th July 2011)

THE CITY AS LUDIC INTERFACE - VECTORS OF VIREAL TESTLABS IN URBAN MEDIATECTURE

Georg Russegger

This paper focuses on new forms of artistic and playful assemblages within urban environments. Artistic project cultures which are using existing media-technological infrastructures, networks, communities and ideas to invent new frameworks to interact and experiment within the city.

Introduction

This paper focuses on new forms of playful assemblages within urban environments. Artistic project cultures which are using existing media-technological infrastructures, networks, communities and ideas to invent new frameworks to interact and experiment within the city. By this means media architecture developed in urban space not only relies on building materials, but also encompasses a virtual framework to enable "new socio-cultural contingencies"(1). These have intensively changed over the last decades because multiple extensions of media-infrastructures e.g. mobile-technology, locative-media and location-based-services have been installed largely in the city. Under these circumstances urbanity has become a complex interface, which is one of today's dominant forms of human selforganization. To deal with these developments on an artistic level, ludic methods are opening chances to get to know possibilities, risks and new forms of interaction within this emerging new communication formats. Ludic in this sense stands for a playful practice of testing out possibilities without a clear goal or ruleset. It stands for approaches characterized by experimental and mistake friendly behavior, to create a perspective shift in user centered data handling and mediated self-representation. Based on joy and motivation of looking at this mediated disposition in different ways, it forces artistic projects driven by flowful interactions. As an effect it foments new ways of abstraction by using public space in unusual and alternative ways to produce an unforeseen intermingling of real and virtual spaces. It seems that the city itself is becoming the environment of choice for media activists and alternative artistic structures. The city is turned into a ludic interface, a playful environment and urban playground by several artistic projects that transform it into a performative space. They are as well working as access points for a better understanding of media-technological infrastructures and tools to create a new understanding on the value of public space in urban environments. My presentation based on this paper will introduce examples of new artistic practices and ability profiles using the city as laboratory, exhibition space, communication platform or hackspace. These examples will exemplify an understanding of ludic interfaces as artistic test-spaces and proto-types based on a reinvention of urban space.

Ludic Tendencies in Media Arts

Starting my research nearly ten years ago on artistic projects using locative media and mobile technology the movement shared plenty of fresh ideas and concepts how this can shape the vectors of interaction in urban space. At this time it was hard to use the available, mainly proprietary, soft- and hardware

to get artistic projects done properly. Artists invented concepts which had to be rich on connotation and storylines to encourage the very raw and minor opportunities with this new media- and communication-infrastructure. Today the available technologies have been opened up on availability and extracted a large global community of modding culture, home brew technologies and DIY inventions based on media-technological artifacts. Artistic projects like the artist collective LUDIC SOCIETY(2) or UBERMORGEN. COM(3) still follow a hacker paradigm and by this means try to use the available infrastructures under conditions they haven't been designed for or to circumvent limitations. Early projects like the ones from the meanwhile well know group „Blast Theory" tried to get their hands on users, receivers or partici-pants, to enable them within a method of gameplay. On the contrary many artistic projects from the field of digital media based arts have nowadays been transformed into small businesses. Former artists are working as programmers or designers for all kinds of smart-phone apps, media companies or star-tups on mobile social media to make there living. This reminds to a blog entry on the website called „Networked Publics"(4), where I was reading the following quote from Michael Liebhold and Anthony Townsend, both working at this time at the „Institute for the Future"(5). They forecast:

"Geohackers, Locative Media Artists, and Psychogeographers, as key players in constructing the 'geospa-tial web', in which the web becomes tagged with geospatial information, a development which is having enormous unharvested business opportunities."

As we see today this has become reality dealing with an infosphere of mobile computing and locative media. It has as well become a mass movement of mediamorph lifestyle, which is constantly expanded by thinkers, designers and producers. For the arts this means more or less to get sober again from the businessman's dream of interface phantasms and the endless dream of (thin) innovation. At the mo-ment it seems that the playful potentials of artistic projects to try new things out and experiment within the city as interface are at risk to get fettered by „playbour" (J. Kücklich, 2010), using playful methods as new forms of productivity and resource in a post-industrial age. Since cities have turned into enriched mediadispositions with hyper accesssibility and endless numbers of devices, sensors, cameras and net-works alternative abstraction models based on artistic interventions have to be enabled. It emphasizes the fact that artistic practices have to recapture the freedom to create meaningful small scale projects within an experimental setup. Reintroducing basic situationist practice such as "dérive" can help to see the city as a laboratory, where people create shared backgrounds and intensions to experience things on a quite open level of understanding. On this level artistic methods of playing in the city can invite users to taking part in actions they might don't know or realize.

The City as Playspace

The ludic approach of artists dealing with media technological interfaces becomes more and more re-lated to context- and interaction-design rather than to the technical configurations of the interface it-self. Projects using the city as playspace, like the LUDIC SOCIETY's projects called "Tagging the City"(6) is using technologies like RFID-chips and digital mapping systems which are applied in a citywide game-play. With the slogan "we are selling play not game" they also created an open framework of how the

conceptual structures of the project can be understood. Another example is the project "re:farm the city / tools for urban farmers"(7) ,which combines the topics of urban farming, guerilla gardening and media arts with the support of a global mobile phone based gardening interface. Both projects function on a level where new awareness and relationship to the territory is created by a ludic interface and by new forms of interaction scenarios on the intersection of real and virtual space. It introduces the chance to create awareness for users and change their knowledge and habits by transforming the way to deal with their interests within a certain environment. This art projects are using existing structures in new ways by the reconfiguration of preexisting infrastructures of media architecture. The basis for the usage of the city as playspace is created by a large amount of opportunities within media-technological infra-structures. The introduction of new technical programs opens up the development of ideas to establish new alternative social and cultural programs of interaction for users and producers. The catalyst for this development is the "digital ground"(8), like Malcolm McCullough calls it, which is embedded into the city ground. By this means the significance of computing in this environment has become its capacity to let us take part in shared representations of action, as Brenda Laurel describes this in her essay "Computers as Theater"(9).

Using and expanding the city as interface of social, cultural, artistic, (media-) technological and architectonical interactions is not common practice and common ground so far. At the moment the city still functions as a laboratory for temporary usage, and ad hoc appliance, even if the gentrification models are strong they seem unsustainable for a valuable development of cultural sustainability. One of the interesting challenges will be to attract people to invent as interesting social interaction spaces as the buzz of technology used to create.

References and Notes:

(1) cf.: Urban Fictions; Eds.: M. Faßler, C. Terkowsky; Wilhelm Fink Verlag; Munich 2006

(2) http://www.ludic-society.com (last accessed: 21th July 2011)

(3) http://www.uebermorgen.com (last accessed: 21th July 2011)

(4) http://networkedpublics.org (last accessed: 21th July 2011)

(5) http://www.iftf.org (last accessed: 21th July 2011)

(6) http://www.ludic-society.net/tagged (last accessed: 21th July 2011)

(7) http://www.refarmthecity.org (last accessed: 21th July 2011)

(8) Digital Ground; Malcolm McCullough; The MIT Press; Cambridge, Massachusetts 2004

(9) Computers as Theater; Branda Laurel; Addison-Wesley Professional; Indianapolis, Indiana 1993

VIRTUAL DOPPELGÄNGERS: EMBODIMENT, MORPHOGENESIS, AND TRANSVERSAL ACTION (PANEL INTRODUCTION)

Susan Elizabeth Ryan

In 1969 Gilles Deleuze theorized the Body without Organs (BwO). The term refers to the virtual dimension of the body likened to the egg as site of embodiment (in Deleuze and Guattari's *Anti-Anti-Oedipus*)—a set of multiple potentialities and dysfunctional repetitions. In this panel we seek to explore the relations between fleshly bodies and digitized ones as sites of embodiment for our current, informatically energized existences.

In 1969 Gilles Deleuze theorized the "BwO" or Body Without Organs (in *The Logic of the Sense*, after Antonin Artaud's origination of the term in 1947). [1] [2] BwO refers to the virtual dimension of the body and its potentials, likened to the egg as the site of embodiment. [3] This BwO-as-egg is further described by Deleuze and Guattari as a set or "*spatium*" of multiple intensities or potentialities. Deleuze and Guattari's body without organs is not against organs, per se, but opposed to the *organism*—the body subjectivized through organization. [4] Moreover, there must remain a connection between the organism and the BwO. D&G: "You have to keep enough of the organism for it to reform each dawn; . . . you have to keep small rations of subjectivity in sufficient quantity to enable you to respond to the dominant reality." The BwO is a way of transcending the strata of subjectivity and freeing its lines of flight.

The image of the BwO is one that, for many, has suggested the analogy with the digital or avatar body, clearly a BwO, but only insofar as it is fluid and unsubjectivized and occupies what D&G call the "plane of consistency," for which the virtual world stands as a figure. Slavoj Zizek even calls Deleuze the "philosopher of the virtual." [5]

In the spirit of the BwO thus interpreted, then, this panel explores relations between fleshly bodies and digitized ones as sites of embodiment for our current, informatically intensified existences. From Facebook to online games and performances in Second Life, many of us experience various parts of our lives virtually today. But how are these experiences absorbed into our so-called "real life"?

There have been controversies and supporting studies (esp. concerning virtual games) suggesting that too much virtual mediation is harmful to our "sense of reality" and ability to interact well in society. This idea has been around for a long time as progeny of old, unresolved debates about violence on TV. Clinical studies of violent virtual games are still ongoing and as yet inconclusive, but speculation continues. And many say online socializing, which (like gaming) offers action free of consequences, has encouraged the growth of bullying and even occasions of lynch mob mentality, pointing to phenomena such as the responses to the recent Casey Anthony trial in the US (the young Florida woman charged with murdering her infant daughter). That trial, which used virtual simulations in the courtroom itself, was the subject of obsessive coverage in both TV and social media including animated simulations on YouTube of the crime scene for "virtual jurors." Media pundits speculated as to whether or not heightened access to visualizations of the case incited members of the general public, who repeatedly mobbed and fought

each other to gain entry to limited public courtroom seats, and demonstrated for a guilty verdict, outside.

In our session, Patrick Lichty will discuss the scientific discovery of mirror neurons, which attach us to others, or the images of others or ourselves, on an autonomic level. Researchers like Jeremy Bailenson (Virtual Human Interaction Lab, Stanford University) and Nick Yee (Palo Alto Research Center) provide evidence for the idea that our conduct as avatars in online worlds has an aftereffect, a "Proteus effect" as Yee calls it, such that our behavior and feelings in real life are adjusted. In a study in which participants were given tall avatars and asked to negotiate tasks with other (shorter) avatars, subjects were then told to negotiate similar tasks with people in real life. The study found that persons experiencing taller avatars negotiated more advantageous results, and this effect also carried through when they negotiated a similar deal face to face—they "acted" taller, in effect. [6]

Bailinson's group did studies of *doppelgängers* - specifically, avatars that are built to look exactly like us. In a series of studies, Bailenson and co-researcher, Jesse Fox, at Ohio State, used doppelgängers as theraputic tools. Test subjects who observed their near mirror images exercising and losing weight, for example, were followed after the test and shown to be more inclined to exercise than a control group. Subjects who observed their virtual selves manipulated to look much older, displayed heightened interest in their retirement savings. Studies were, of course, suggestive rather than conclusive.

But similar effects are the focus of simulations like the multi-platform "Always in Season Island" an educational and consciousness-raising project in which (when the Second Life portion of the site is released) visitors will participate in reenactments of lynchings and torture that took place in the American South from the 18th century through the mid 1960s. [7] Participants will see their clothing transformed to period dress, and they will become virtual witnesses. They will also receive information about historical lynchings and be connected to the project's Twitter or Facebook pages to share their feelings about the SIM. The project aims for responses that show real concern for the scenarios because of the experience of virtually witnessing them and bearing the moral tension such witnessing holds.

According to philosopher and researcher Philip Brey, there are clear ethical issues entrenched in our behavior as virtual selves, and these involve two categories of assumptions; he writes:

According to the argument from moral development, it is wrong to treat virtual humans cruelly because doing so will make it more likely that we will treat real humans cruelly. The reason for this is that the emotions appealed to in the treatment of virtual humans are the same emotions that are appealed to in the treatment of real humans . . . The argument from psychological harm is that third parties may be harmed by the knowledge or observation that people engage in violent, degrading or offensive behavior in single-user VR . . . [8]

Clearly, our evolving abilities to mash up real and virtual existences has both therapeutic and educational potential, but also responsibilities. It holds promise of empowerments—Deleuzian *intensities*—but also of manipulation and subjectification.

Sherrie Turkle suggests that most of us already live in both virtual and physical realities and our "life mix," as she terms it; our "multi-lifing," has become the norm. It can function efficiently or go off the rails, but Turkle finds that the most beneficial doppelgängers - beneficial, that is, for their real operators

and overall life mix - are those who participate in "real" online relationships, or situations with consequences. [9]

The session addresses both artworks and theoretical frameworks that engage our replicated bodies, the relations they create, and their transversal effects across multiple platforms and modes of existence. Greg Little will tell us more about the metaphysics of the BwO in the context of avatars. Micha Cárdenas and Elle Mehrman explore how virtual experiences can transform our real-world identities. Stephanie Rothenberg will discuss the mash-up between work and play. And Patrick Lichty discusses affective potential of virtual performance art.

References and Notes:

1. *G. Deleuze, The Logic of the Sense (New York: Columbia University Press, 1990).*
2. *A. Artaud, "Body without Organs," Pour en Finir avec le Jugement de dieu, Radio Française (Paris, November, 22-29 1947).*
3. *G. Deleuze and F. Guattari, Anti-Oedipus (London: Continuum, 2004).*
4. *Deleuze and Guattari, A Thousand Plateaus (Minneapolis, MN: University of Minnesota Press, 1987), 158.*
5. *S. Zizek, "The Reality of the Virtual," in Organs Without Bodies, (London: Routledge, 2003).*
6. *N. Yee, "The Proteus Effect" (PhD. diss, Stanford University, 2007): 46-50.*
7. *"Always in Season Island" is created by Jacqueline Olive with consultants. See: http://www.alwaysinseasonisland.com/*
8. *P. Brey, "Virtual Reality and Computer Simulation," in Handbook of Information and Computer Ethics, eds. K.Himma and H.Tavani, 361-384 (Hoboken: Wileyand Sons, 2008).*
9. *S. Turkle, Alone Together (New York: Basic Books, 2011), 160, 223.*

CRYING WITH THE VIRTUAL

Semi Ryu & Stefano Faralli

This paper will deal with the ontological issue of the virtual body, exploring the rich meta sensory experience of the user with an avatar. It will explore the sensory dimension, emotional flow, and transcendental quality of the virtual body. This will be investigated in the context of Korean experiential reality and the concurrent process of gradually transforming emotional psyches.
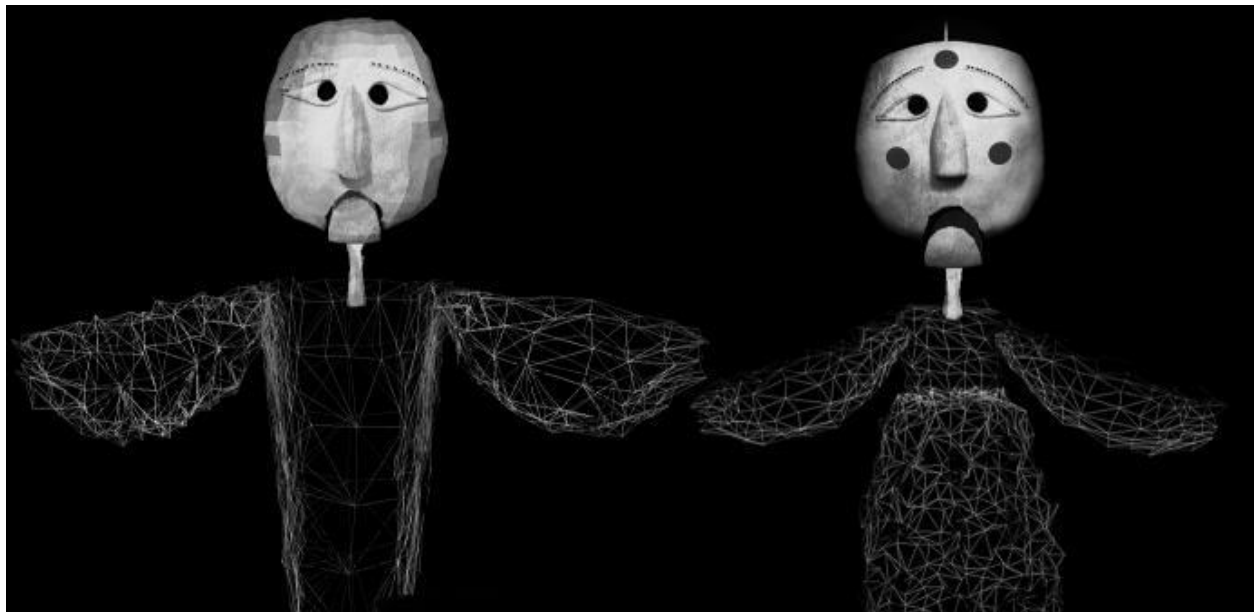
Parting on Z London, 2010, Semi Ryu, Interactive Media Performance, Copyright Semi Ryu and Stefano Faralli.

Introduction

Historically there are evidences of individuals inhabiting an alternative body in many ritual and performative contexts. Becoming a ritual body, or leaving/transcending the physical body, demonstrates the continuous emotional development and perceptual changes of body and mind over time. It provides a platform for understanding the potential of digital bodies in virtual space; what we call "avatars."

Virtual space affords an infinite depth along the Z-axis, bearing both physical and psychic dimensions. Virtual bodies traveling on such a vast Z-axis constitute new ritual bodies parting on Z, becoming increasingly remote, intangible, flexible, deconstructed, multiplied, and fragmented. Virtual bodies present us with a new challenge and distance to overcome in the process of interacting, communing, spiraling, coping or conflicting with the actual body. This paper introduces a paradoxical inquiry of seeking the full potentiality of being and experience between multiplied selves assisted by digital technology.

Korean experiential reality runs on infinite paradoxical loops, swirling like a tornado, deeply touching the human psyche and emotion. It integrates body and mind, creating a meta layer of experience and body, continuously negotiating the state of "neither-nor": neither physical nor mental, neither actual nor virtual. The emotional flow of the meta body will be explored through the perspective of Korean experiential reality—a paradoxical process of constant becoming—and through the "virtual" as the potentiality of being and experience in the digital age.

Ritual Body, Parting on Z

In order to discuss the virtual body, we begin by discussing the alternative bodies used in ritual, such as masks, puppets, and performing objects. These ritual bodies have the essential characteristic of continuously traveling on the Z-axis in both the physical and psychic dimensions. In the history of ritual, mask, and puppetry, technological development has focused on the critical quality of the ritual body continuously parting from the actual body. Baird notes that "gradually, in the course of centuries, the hinged and jointed mask moved upward, off the head, and was held in the hands in front of the body. Later it moved farther away and was made to live by the manipulation of strings. [1]Baird's linear progression places the ritual body on an outward trajectory, leaving the performer's body and changing from a mask to a puppet. In this evolution of the ritual body, the moment of physical detachment from the performer's body is a critical shift, yielding two centers of gravity. Kaplin notes,

 "The performing object has become detached from the actor's body, developing its own center of gravity, its own presence. It is at this point, where the center of gravity of the performing object and the performer are distinct from each other, that the term 'puppet' can be used." [2]

This moment of detachment and separation would be the point of farewell between the actual and ritual body, creating distance. Distance provides, in both the physical and psychic dimensions, the ability to watch one's own performance on the Cartesian Z-axis at eye level. Separation yields detachment, but also a view on one's own becoming. This separation is a tragedy, which activates the paradoxical process of the ritual of becoming, akin to an impossible love dilemma between symbolic lover. The potential body constantly parts from the actual body in farewell. Supported by virtual interactive technology, the ritual body parts on the Z-axis of the virtual realm—the metaverse—over the network. In this context, virtual space can be considered an infinite space for farewell. It becomes a space for an active void connected with Korean experiential reality initiating the ritual—tearful, but also joyful.

Korean Experiential Reality: Active Void

Korean experiential reality is about lightening the weight of actuality in order to open the infinite space of meta realms to full potentiality. [3] Distance is created and even celebrated. If one continuously "fills" oneself, one becomes overloaded—too heavy to fly. Taoist Lao-Tze tells us to empty ourselves until we are light like a feather, and then "being itself" will find place in the void. Emptiness will take us to the sky, to the infinite space of meta realms where we may find being itself—potentiality. [4] In this space, emptiness will shift into fullness. The void will be filled. This is the paradoxical state of *Heo-Lyeong-Chang-Chang*—completely empty and completely full. [5] It is the Korean experiential reality in continuous conflict between the actual and the meta layer; the chaotic state of neither here nor there—a quantum state of paradox. This state is an "active void," an ontological journey of taking flight—continuously dreaming, desiring, and eventually transcending the sky.

This is a complicated and rich emotional psychic journey, presenting:

- *Jung*: the nostalgic dream towards infinite oneness—unconditional love
- *Han*: an extreme state of grief, distinguished by a strong wish to overcome a situation that seems impossible
- *Shin-Myeong*: the ultimate state of playfulness and joy
- *Moo-A*: a transcendent state of quiet mind and detachment from the phenomena, which moves our attention to the horizon, looking at entire quantum fields of nature.

Jung

Jung is the Korean psychic feeling of "us" [6] It represents strong nostalgia towards infinite oneness, and the Korean sense of affecting and caring for each other. The Korean word *Ha-Na* means "one" with the added dimension of "single" or "whole," reflecting continuous movement between single and whole. [7] Jung is voluntary emotion towards other selves, transcending rational criteria of judgment or likability. [6] There are two opposing cases where Jung might be created.

Mi-Un Jung is created when one individual experiences difficulties and disagreements with another. Individuals may not like each other, but this situation creates Jung between the persons as they share time, place, and story together. On the other hand, *Ko-Un* Jung is generated when one individual has positive experiences and memories with another. Jung is usually mixed feelings of these opposing aspects—some of Mi-Un Jung and some of Ko-Un Jung. Even if the two Jung start from almost opposite situations, they are considered to be the same Jung. Jung is a warm and peaceful mind embracing all, beyond agreement, belief, preference, comfort or likability.

Jung is a property of connection not only between human beings but also between human beings and inanimates, such as between a human being and the sky. Jung may also be explored between the actual and virtual body, pursuing infinite oneness in potentiality. It is like the concept of Eros in Whitehead's terminology, which states that the unification of the ultimate is Eros. [8] Eros is the will for life towards which every potential being strives.

Han

Han exists on the other side of Jung. Ironically, Jung sensitizes us to the distances we confront in our daily lives. However, there is a sense of deep frustration and incompleteness about our current situation of "not yet one," paired with a strong desire to overcome the limitation. Han emerges from the gap between potentiality and actuality. At the end of Jung, there comes Han. [9]

 Han is a paradoxical state of consciousness that combines an extreme state of grief in a feeling of incompleteness with a great hope and desire for overcoming the situation that seems almost impossible. Han is the Korean psyche of the determinant of the struggle. It is created in the void we are eager to fill. It is a complicated emotion composed of a grief and a strong will to overcome that grief. Fundamentally, Han is a feeling of incompleteness and absence, activating the powerful wish to be completed or fulfilled in infinite wholeness. It is a determination of the struggle with and honest examination of the current tragedy in a fundamental level of Korean consciousness. In a romantic sense, it is a tragically impossible

love story. It is the Korean way of lightening the one's psychic weight by acknowledging one's pain in a dream of flying to full potentiality.

Han has tremendous power to turn the world upside down. What the king of the Cho-Sun dynasty of Korea feared most was to see people looking up to sky with sighs or tears, since this is the sign of Han. Han calls forth revolution, which makes people look to the sky with fearsome desire for change, wishing to fly. Han motivates people to see beyond restrictive procedures and power structures, opening their eyes to fundamentalinquiries.

Shin-Myeong and Moo-A

Shin-Myeong, the ultimate state of playfulness derived from Han, is the opposite state of tremendous constraints. Han works as a springboard, allowing us to fly higher and higher. This condition brings a synergy that cannot be explained in a logical way. It has the dynamic power of swirling movement, passing from one to another. The real potential of Shin-Myeong is driven by Han. [10]

The paradoxical relationship between Han and Shin-Myeong can be described in the Korean clown's tightrope walking: the act appears risky; the clown is unstable and unbalanced, continuously swinging left and right. The clown usually holds a fan in one hand, which seems to defy the act of balancing but actually demonstrates a different philosophy. One oscillates continuously between balancing and unbalancing in order to find the greater moment of balance. It is the cosmic "tree" connecting two separate poles—left and right. The taller the cosmic tree, the more unstable it appears, and, paradoxically, the greater its stillness also appears. We may find ultimate joy in this process of unstable walking.
The deeper the Han, the more Shin-Myeong and the more powerful the ritual.

In the climax of the Shin-Myeong, the experience would move to a meta layer, detached from the phenomena. It is this shift from desire to non-desire, from mind to no-mind, which turns the world upside down. [11] It is the moment when we realize that we and the sky are parts of the entire picture; we are looking at the sky transcendentally in a no-mind state. This is the Korean state of Moo-A-Ji-Kyung, or Moo-Shim, where the self is completely erased, abandoning our tedious efforts for owning or rationalizing. This state is quiet but also noisy. It welcomes the tremendous paradoxical conflicts of the actual and potential, but the frequency rate exceeds the audible range of human perception, and therefore we experience quiet, as in the eye of the storm. This is the point when our experience turns upside down, accompanied by completely different perception. Our narrowed focus shifts to the horizon, and we move from desire to non-desire. We find our entire selves looking at the sky with the ability of looking at entire fields—being itself. This state brings sensory integration, meta sensory experience, and intuition—opening space for creative imagination.

Virtual Body

Deleuze defines the virtual as a potentiality that becomes fulfilled in the actual, adding that this state is not material, yet it is real. [12]

In Korean experiential reality, the actual and the virtual contrast and balance each other in a paradoxical context. The virtual as full potentiality of experience can only be defined "from" and "through" the actual layer in the effort of erasing the actual itself, creating an "active void." It is an ironic process of creating the problematic situation of impossible love on purpose.

In the virtual puppetry projects presented here, the word "virtual" continues to be in the context of Deleuze, but also refers to the technical terminology of 3D "virtual" interactive technology, proposing a marriage of ontological and technological issues. The physical presence of the user has been transferred to a virtual body, such as an avatar, a virtual object, or sometimes to an entire virtual space. I seek to find Jung between multiple bodies in multiple dimensions voluntarily having affection and feelings for each other. Here we can begin to process the ritual through the different entities as they are emotionally and psychologically involved.

It has been said in Korea that Jung exists between the human and the sky. [5] In the state of Jung we feel another's heart and emotions, even with inanimate things. Feeling others' hearts is a Korean way of extending one's own body, organs, and senses. Jung is a way of relocating, distributing, and expanding the body to a different dimension of reality.

Crying with the Virtual: Performer's Perspective

My virtual puppetry projects explore the paradoxical relationship of multiple body presences in the layers of virtual, actual, and in-between, within the context of impossible love. The story of impossible love highlights the tragic component of the cosmological relationship, exploring the infinite and loving-constant process of dreaming the virtual.

Although this virtual puppetry project is still in the beginning stages of critical inquiry, my experience performing "Parting on Z" in London would be an interesting case study for future research. In collaboration with Stefano Faralli and in the context of the ritual body parting on the Z-axis, the "Parting on Z" performance explored Han in the paradoxical relationship between the virtual puppet and the puppeteer via the distance between avatar and user—symbolic lovers facing each other, continuously exchanging dialogues of love and farewell. The story chosen for this performance was the farewell scene from Chun-Hyang-Ga, the Korean impossible love story that demonstrates Han. The entire performance produced a flow of sensations, moving from Jung to Han and field consciousness. My experience as performer was emotionally overwhelming, causing my whole body to shake and weep with my lover-avatar, and the audience appeared to make an emotional connection to this performance. The performance started with an impossible relationship between two virtual lovers, and then it evolved to a relationship between the virtual body (avatar) and actual body (performer) as they faced each other and exchanged dialogue.

Speaking into a microphone and standing on a Wii Fit balance board, I played two virtual characters who are deeply in love but having to say farewell. The realtime voice input and balance signals from my body caused the virtual puppets to produce synchronized and responsive face and body movements. In the middle of the performance, I turned on two candle lights, which projected onto my face. I was dressed as Chun-Hyang, the female character, and started performing her in real space, facing Mong-Ryong, her male lover, as a virtual body on the screen. From this point forward, there was a farewell between my actual and virtual body. The process of handing Chun-Hyang's ring to Mong-Ryong and drinking from a glass in farewell was emotionally overwhelming. My body and lips were trembling violently, and I was unable to speak.

During the last scene, as I watched my lover slowly disappear beyond virtual fields, I walked with him in virtual space connected by the Balance board. I was standing on my toes, lengthening my neck and narrowing my eyes. Based on the original script of Chun-Hyang-Ga, I said, "You look as big as a moon, a star,

a butterfly, a firefly, and disappearing beyond the horizon (Z). I don't see your shadow. I don't see even a bit of shadow." This describes the constant process of parting on Z, putting this farewell in a two-dimensional perspective—a different dimension of reality which is quite humorous and poetic. I felt myself stop crying in the middle of the process, in an extreme state of grief but with a smile on my face, by the time my virtual lover was the size of firefly. I began looking at entire virtual fields connected to my walking steps. My attention had shifted from a narrowed focus to the horizon. I watched my virtual body departing over the horizon until he became a tiny bit of shadow, a tiny bit of information, slowly disappearing on the Z-axis. I maintained my gaze until his tiny bit of body was erased completely, just as Korean people wave goodbye until the other is completely out of sight. This may be a way to welcome and celebrate the full pain of farewell: grief, regret, and longing; the full process of emptying self. I left my avatar to infinity, forever walking on Z.

Future of Virtual Puppetry

I have been working on virtual puppetry projects in collaboration with Stefano Faralli, exploring the relationship between the user and the virtual body. It started in 2002 with the simple idea of a voice-activated puppet, investigating the spiraling interaction between puppet and puppeteer. This involved a talking puppet lip-syncing with the user's words spoken into a microphone, which somehow magically drew the user into a transformative state in the process of oral storytelling. Oral storytelling has been a major component of virtual puppetry, with its roots in shamanism and traditions of mask and puppet theatre. Computer technology can support a free improvisational environment for live orality. Data analysis of human voice such as texture, volume, rhythm or tone adds more playful interactive components and fosters an interesting relationship between the actual and virtual body. Potentially, a combination of speech recognition and simple text classification techniques can produce a generic idea of the topic of the dialogue, and open the possibility of appropriate graphic and/or acoustic feedback for perceptual developments in human psyche. By deeply investigating the psychic and emotional states of the performer and spectators, virtual puppetry may benefit those who have difficulties communicating in traditional ways.

References and Notes:

1. Bill Baird, The Art of the Puppet (New York: Macmillan, 1965), 30.
2. Stephen Kaplin, "A Puppet Tree," in Puppets, Masks, and Performing objects,ed. John Bell (Cambridge, MA: MIT, 2001), 23.
3. Y. Kim, Understanding of Korean Aesthetics: Looks though Korean Habitus(Seoul: Ewha University Press, 1998), 291-293.
4. Y. Kim, No-Ja and 21st Century (1) (Seoul: Tong-Na-Mu, 1999), 192.
5. S. Kim, Donghak and Process Philosophy (Seoul: Ji-Sik Press, 2001), 279, 309-310.
6. S. Choi, "Korean Psychology of Shim-Jung: Phenomenological understanding of Jung and Han," in Proceedings of Daewei Symposium (Seoul: Korean Psychological Association, 1993), 9, 15-17.
7. K. Lee, J. Park and O. Cha, The Root of Korean Life Philosophy (Seoul: Ewha Press, 2001), 64-65.
8. Alfred North Whitehead, Adventures of Ideas (Harmondsworth: Penguin Books, 1933/1948), 295-296.
9. M. Han and S. Han, "Cultural Psychology of Shin-Myeong," in Korean Journal of Psychology 26, no. 1 (2007): 85.
10. D. Cho, Catharsis, Rasa, Shin-Myeong (Seoul: Ji-Sik Press, 1997).
11. Steve Odin, Artistic Detachment in Japan and the West: Psychic Distance in Comparative Aesthetics (Honolulu: University of Hawaii Press, 2001), 36-39.
12. Gilles Deleuze, Bergsonism, trans. Hugh Tomlinson and Barbara Habberjam (Brooklyn: Zone Books, 1988), 96-100.

SUZUMUSHI: A SILENT FUTURE

Gavin Sade

This paper introduces the creative work *Suzumushi: the silent swarm,* produced by Kuuki. The paper provides an outline of the work and draws together the ideas that influenced the works form, the conceptual material and interaction design, including acoustic ecology and emergence.

Fig 1. Suzumushi: The Silent Swarm (2011) Priscilla Bracks and Gavin Sade. A view of the work installed at the State Library of Queensland with the cricket in the foreground displaying text from a recent search of the library database. Laser-cut stainless steel, post-consumer plastic and electronics. Dimensions variable. Image: Gavin Sade.
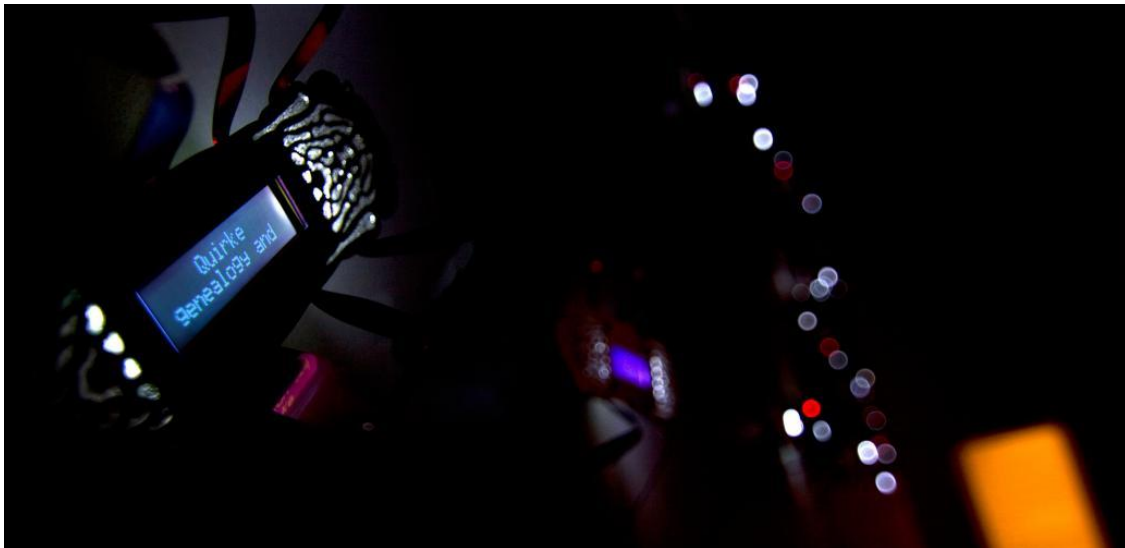
Fig 2. Suzumushi: The Silent Swarm (2011) Priscilla Bracks and Gavin Sade. Seven crickets, each displaying an onomatopoeia call . Image: Gavin Sade.

Fig 3. Suzumushi: The Silent Swarm (2011), Priscilla Bracks and Gavin Sade. A single cricket displaying an onomatopoeia call. Image: Priscilla Bracks.

...chaos is always there to serve as a foundation, the noise is always there to invent new music and new harmonies, the beautiful noiseuse *always there, a horn of plenty whence come thousands of forms, the source of brilliant pictures.* [1]

The emergence of a creative idea from what Serres describes as a foundation of chaos is often difficult to trace. Yet in the context of practice-led artistic research there is an interest in charting the dynamics of the emergence of creative ideas, their transformation through practice, and interaction with the worlds in which they draw meaning. For *Suzumushi: the silent swarm* the seeds of the idea can be found in the a coincidence of seasonal sounds, specifically that of crickets and cicadas in South East Queensland, acoustic ecology and an interest in the way species of animals and plants tell stories about the world we collectively inhabit. The work is part of the *Specimen* series of interactive sculptural works produced by Kuuki, which are each created as speculative species that exist within human constructed niches.

It was the process of thinking about sound in the context of the *Specimen* series that resulted in a creative work about sound and noise becoming silent. This direction is informed by Schafer's research into acoustic ecologies, [2] a focus that has been an aspect of Kuuki's work since *Charmed.* [3] In his work Schafer proposes that many species develop calls that fit niches within their acoustic environment. He also describes how an increasing background of "lo-fi" noise dominates the acoustic environment of urban human habitats. Thus it was the experience of standing on the side of a busy city street – where the passing traffic and construction drowned out the sounds of insects and birds – that lead to the silent cricket in this work.

The silence in *Suzumushi* also comes from a tension we found in *Charmed*. The sound design for *Charmed* was informed by Schafer's observations about our increasingly lo-fi acoustic environments, the listening situation – headphones within a controlled gallery setting – presented the noises of urban environments as what Schaeffer would call sonorous objects within a composed sound-scape.   While Schafer's acoustic ecology focuses on sonic environments and their "health", Schaeffer's *musique concrète* considers the musical possibility of all sounds when separated, or abstracted, from their source. [4] It is this tension that we wanted to explore in *Suzumushi*. Instead of giving the crickets an artificial voice, or composing a soundscape for the work, we created a silent work. This was in part an exercise in restraint, as the electronics for the work were designed to include a vibration motor to simulate cricket stridulating. When the sounds of our world are transformed into music, or used in a "musical context" within designed listening environments and situations, the question is not one of sound pollution, but one of aesthetics. When experienced in the world, the questions are very different – they are about the character, richness, and health of an acoustic environment – how it tells the story of place, marks the passage of the day and the seasons. Thus it is through silence that we draw attention to sound and the act of listening.

In making *Suzumushi* we do not aim to present a quieter world as some form of ideal or healthy acoustic environment. Instead we set out to create a speculative species that has evolved to fit a niche within a human designed world. This speculative species of *Suzumushi* is not actually silent, but communicates via short messages at radio frequency inhabiting one of the human regulated bandwidths. Technically the swarm forms an adhoc XBee wireless network communicating in short bursts in the range of 2.4Ghz. While humans cannot hear this communication, the crickets' call has not disappeared entirely from human perception. It has been transformed into onomatopoeia displayed on a small LCD screen on their back. The audience thus speaks the calls aloud or as an inner voice, as they attempt to pronounce "tz tz tz tz tz" or "rin rin ricket".

While our speculative cricket species has evolved in this manner, it is hard to imagine such an evolution considering that the sound of crickets and cicadas in summer where we live in South East Queensland, Australia, can at times be so loud, so unavoidable, that it drowns out everything else, even making it hard to think. However, it is an uncanny coincidence that a after we settled upon silent crickets we were to discover that a species of cricket, the *Teleogryllus oceanicus,* on the Hawaiian island of Kauai has rapidly evolved to become silent. [5] Not in response to human made sounds, but in order to avoid a new predator; the *Ormia ochracea*, which has exceptionally good directional hearing and locates it prey by its call. In this example of rapid evolution there is a strong relationship between sound production, sexual selection, hearing and humans; as the *Ormia ochracea* invaded Hawaii from North America presumably hitching a ride with humans.

It is living in close proximity to humans, and in human made environments, that has guided the evolution of our *Suzumushi*. Not only have the crickets evolved to communicate within this new environment, but it has also shaped their calls. The swarm of *Suzumushi* are slowly replacing their onomatopoeia with text scrapped from human networks – more specifically searches of the State Library of Queensland (SLQ) databases made by the public. This choice of data source was made because SLQ was the site of the works first major public exhibition, in *LUMIA art | light | motion* 2011. Like the Australian lyrebird, the subject of a pervious creative work in the *Specimen* series, [6] the *Suzumushi* mimic these many voices, which an audience again reads aloud, or as an inner voice, when they encounter the swam. Carroli suggests that this new call of the *Suzumushi* brings forth and makes present an alternative kind of social dialogue, with its brevity evoking the tweet or sms, while the name 'suzumushi' alludes to another literary trope, the autumn kigo in haiku, a word associated with a season. [7]

Since our experience of crickets and their calls are tied to the seasons, our speculative species of *Suzumushi* has evolved to replace once seasonal calls with the 'seasonal' patterns of searching of the SLQ databases. The patterns of memes that pass through the swarm across the day, weeks and months, provided a unique insight into the invisible use of the SLQ databases. At times the swarm displayed strings of numbers that seem intriguing until one realises they are searches for ISBNs. During schools hours on weekdays the searching of school groups drown out any other terms, and overnight searches by genealogist, historians and researchers see the swarm speaking the names of ancestors. Noisy swarms of insects blend into noisy crowds of people, which in a digital age occur not just within the physical world, but a silent environment – beyond our auditory capabilities. Glimpses (or the auditory equivalent) of which we hear as static of a detuned radio, the once iconic sound of a modem, or the chirping of a mobile phone as it induces a current into speaker cable. In the modern open plan office the hum of air conditioning and tap of keys conceals a cacophony of communications, both human-to-human, human-to-machine and machine-to-machine.

Each *Suzumushi* is a stand-alone electronic object that will function as an individual, but when in the proximity of others will become part of a larger swarm. The behavior of each *Suzumushi* is influenced by the calls of other crickets, resulting in emergent patterns of behavior that vary depending on the size of the swarm. The work does not directly encode models of cricket (or other insects) behavior, but is instead loosely inspired by a pastiche of insect behaviors. For example the patterns of cricket calls as they compete to attract a mate or the relationship between call frequency and temperature [8]. The work is also informed by the cyclical nature of firefly flashing and resulting synchronicity. This synchronicity in a congregation of flashing fireflies is the result of each one continually sending and receiving signals, yet there is no central conductor, instead this synchronicity is emergent. [9] Similarly each *Suzumushi* responds to the radio frequency chirps of other crickets – competing for attention, influencing the call cycles of each other, and propagating texts heard from the network. The combination of insect behavior and language see *Suzumushi* as a mix of insect and social network.

Each of these behaviors is encoded into each cricket as a set or low level rules, when put together in a group of 5, 25 or 50, differing patterns emerge – illustrating one of Johnson's principles of bottom-up systems, more is different. [10] In *Suzumushi* there needs to be a mass of crickets between 45 and 55, one or two do not make a swarm. This emergence of order, or pattern, from the swarm is the result of the interactions between so many individual *Suzumushi*, as well as interaction with the network data sources and the environment. Individual crickets also respond to sound in the environment, with noise triggering calls and influencing call cycles. Thus audiences may talk to a cricket or make other sounds, which will eventually alter the behavior of the swarm. This ability to hear allows the swarm (as a whole)

to map the acoustic environment within which they exist. Loud sounds heard by one member of the swarm triggers calls, and a cascade of interactions between other crickets.

When encountered in a gallery the *Suzumushi* tell the story of the information environments that they exist between, as an audience reads the onomatopoeia cricket calls; sees waves of short search phrases pass from cricket to cricket; and, experiences synchronous patterns of flashing occur or attempts to tell the temperature from the changing rhythms of flashing. For us the story of *Suzumushi: the silent swarm* goes beyond that which an audience experiences when they encounter the work within a gallery setting. It is our experience of cricket calls, from the deafening cascade of calls in summer to the call of a lone cricket in a vase in the living room that forms our lived memory. This work marks a moment in our practice, connects to these memories and experiences, and the acoustic ecology of the place where we live and create. As part of the *Specimen* series*, Suzumushi* another exploration of the complex relationships between the social and the environmental, which has been described as Kuuki's brand of post-environmental politics. [11] Yet the ideas discussed in this short paper and our deeper ecological philosophy and concern for our relationship with the world are not dealt with in a 'didactic' manner. Instead Brown describes Kuuki's approach as "light and playful coercions (…) unwittingly lead [the audience] via a natural and seductive interaction into a space where a more profound comprehension of our world and our place in it can emerge." [12]

References and Notes:

1. M. Serres, "Noise," in SubStance 12, no. 3 (1983): 48-62.
2. R. M. Schafer, The Soundscape: Our Sonic Environment and the Tuning of the World (Rochester: Destiny Books, 1963).
3. G. Sade, "Charmed, from Concept to Reality," in ACM Computers in Entertainment 6, no. 3 (2008).
4. P. Schaeffer, Traite des Objets Musicaux (Paris: Editions du Seuil, 1966).
5. R. M. Tinghitella, "Rapid Evolutionary Change in a Sexual Signal: Genetic Control of the Mutation 'Flatwing' that Renders Male Field Crickets (Teleogryllus Oceanicus) Mute," in Heredity 100, no. 3 (2008): 261-267.
6. G. Sade and P. Bracks, "e. Menura Superba," Kuuki's offical Web Site, 2009, http://kuuki.com.au/emenurasuperba/ (accessed September 2011).
7. L. Carroli, "Exploring Relationships with Nature," in LUMIA: Art/ Light/ Motion: The Art of Kuuki, eds. G. Sade and P. Bracks, 26 (Brisbane: State Library of Queesnland, 2011).
8. A. E. Dolbear, "The Cricket as a Thermometer," in American Naturalist 31, no. 371 (1897): 970-1.
9. S. Strogatz, Sync: The Emerging Science of Spontaneous Order (New York: Hyperion, 2003).
10. S. Johnson. Emergence: The connected lives of ants, brains, cities and software. (London: Penguin, 2002).
11. L. Carroli, "Exploring Relationships with Nature," in LUMIA: Art/ Light/ Motion: The Art of Kuuki, eds. G. Sade and P. Bracks (Brisbane: State Library of Queesnland, 2011).
12. P. Brown, "We Are Just Bits," in UMIA: Art/ Light/ Motion: The Art of Kuuki, eds. G. Sade and P. Bracks, 6 (Brisbane: State Library of Queensland, 2011).

STOP-MOTION ANIMATION: TOWARDS A REALISTIC 3D CAMERA MOVEMENT CONTROL

Laura Saini, Nicolas Lissarrague, Gudrun Albrecht & Lucia Romani

In stop-motion camera animation the camera is slightly moved between frames, and once these are assembled, it produces an illusion of movement. We are concerned with improving the existing stop motion camera animation practice. To this end we present a survey on its current state of the art, and present an "ideal" process for stop motion camera animation in order to develop an animation interface capable of producing realistic camera moves.
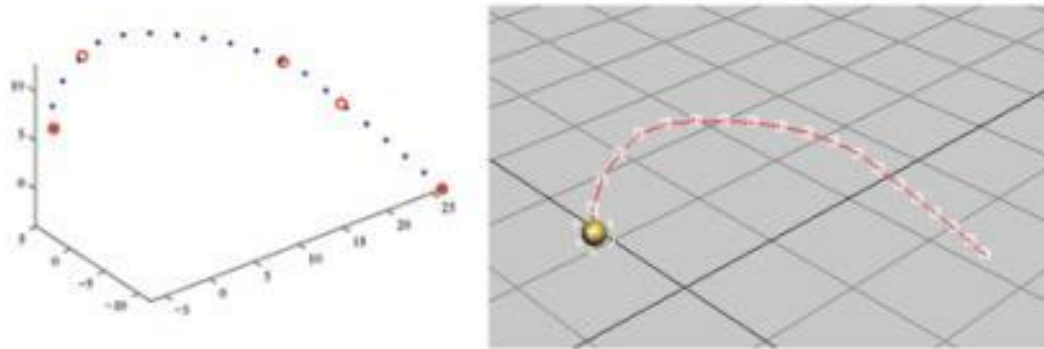
Fig. 1. Left image: the entire parametric Hermite quintic space curve interpolating the keyframes (red circles) and parameterized by equally spaced arc length parameters (blue points). Right image: Motion curve of left image imported in 3D Studio Max.
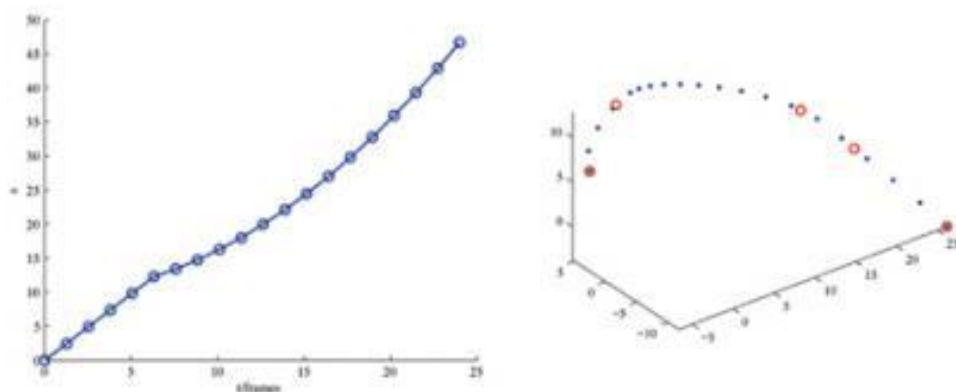
Fig. 2. The Figure in the left shows an Ease curve composed by a linear ($s1(t) = t$ for $0 = t = 6$) and a parabolic part ($s2(t) = t^2$ for $6 < t = 24$). The Figure in the right shows the corresponding parametric Hermite quintic space curve.
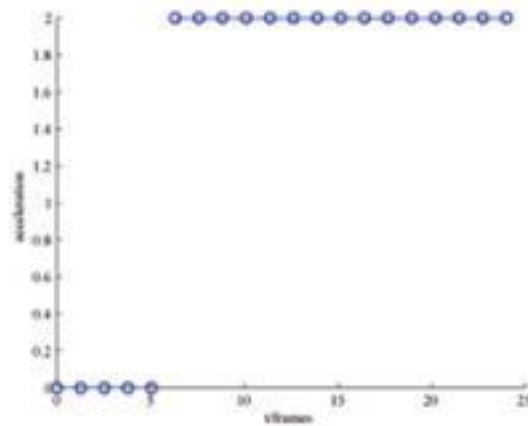
Fig. 3. The acceleration curve corresponding to the parametric space curve in Fig. 2.

1. Stop Motion & Camera Movements: A State of the Art

Almost as old as cinema itself, stop motion is a method of animation that brings any object (model, puppet, clay, etc.) "alive", making it appear to move on its own. By manipulating objects through a series of still positions, photographing each position on a still camera and then playing these as a continuous sequence, the illusion of movement is created. It's a (very) long and (very) tedious process. To complicate the matter, if an animator does a mistake on stage, it is not possible to go back and repeat parts of a movement as it can never be recaptured exactly in the same way. With these constraints, animating the camera is a hazardous task. It is almost an impossible job to move the camera frame by frame along a perfect curve to produce a smooth move, mainly because the slightest imprecision produces an unnatural shake in the final sequence. And, unlike on real stage, there is no way to make several shots and choose the best one as the process is too long: a talented stop motion animator can handle only a few seconds of animation per day:

1. *"An animator's day is structured around the few seconds he will shot, and the delay is judged to be a long one if it is about twelve seconds or maybe an easy day if it is only four seconds long..."* explains Barry J. C. Purves. [1]

For a long time, these technical constraints forced directors to fix the camera on stop motion sets. On the contrary, on real stages since W.D. Griffith in the beginning of the 20th century, camera movements are mainly recognized as part of the aesthetic cinematographic specificity. In order to overcome this frustrating status, stop motion animators first tried to find hand-made tricks that could give more freedom to the camera, but these increase the complexity of the production workflow. In 1993, to obtain the same camera move freedom as on a real stage, Henry Selick used for the first time a motion controlled camera for *"Tim Burton's The Night before Christmas."* Comparing the two ways to move a camera in stop motion, we can resume the benefits and disadvantages of each animation process:

- **Hand positioning**: it can work for one axis of freedom (unusually two, like the travelling and panoramic move in *"The Secret adventure of Tom Thumb,"* David Borthwick, 1993) but no more than two degrees of freedom as the process would become too complex and hazardous; it works well with linear acceleration moves but is not precise enough to handle acceleration ease in and out, or slow moves; adds unnatural shakes to the move because of the human hand lack of precision which on the other hand confers the specific quivery stop motion aesthetic. Some examples of such moves can be found in *"9.99$"* (Tatia Rosenthal, 2008), *"Fantastic Mr Fox"* (Wes Anderson, 2009) or shorts like *"Western Spaghetti"* (PES, 2008) and *"MUTO"* (BLU, 2008). In *"Peter and the wolf"* (Suzie Templeton, 2006), animators even tried to simulate a camera on the shoulder shot for a subjective view of the wolf.
- **Motion control**: as these devices are intended for live stage, their characteristics are far too sophisticated for stop motion needs in terms of speed, size, weight and cost; the device's trajectory is computer controlled by 3D curves such that the camera executes perfect moves. On the one hand this is a blessing for the stop motion process as it prevents from any shake caused by animators' mistakes or imprecisions. On the other hand, this doesn't correspond to the stop motion aesthetic since it constrains the stop motion move to appear as perfect and lifeless as a computer interpolated move. The following movies have used a motion controlled camera: *"Wallace and Gromit: A grand day out"* (Nick Park, 1989), *"Corpse Bride"* (Tim Burton and Mike Johnson, 2005), *"Wallace and Gromit: The Curse of the Were-Rabbit"* (Steve Box and Nick Park, 2005) *"Wallace and Gromit: A matter of loaf and death"* (Nick Park, 2008), *"Coraline"* (Henry Selick, 2009), and also the 2011 advertisings TV campaign for the Brother printers.

In this context we cite Peter Lord (see e.g. [2] and [3]) *"Stop-frame is like live music, played on traditional instruments, compared to a studio recording using the finest instruments in the world, all the latest technology and some electronic instruments. The latter is more polished, more perfect, bigger, better, showier - but maybe lacks humanity. Stopframe is much less perfect, much less polished, unrepeatable, inaccurate - in a word, human."*

This analysis allows us to conclude that a certain limited amount of "shakiness" is desired as it provides realism to the stop motion movie but the process of hand positioning the camera is a too tedious and slow task. We are thus interested in a motion control system specifically designed for stop motion that is able to simulate a realistic (hand made) camera animation. To this end we first review the existing tools for camera animation in section 2 and then describe the first steps towards a new system for controlling camera movements for stop motion in section 3.

2. Existing Tools for Camera Animation

As our new system's objective is to allow precise camera moves on stop motion stage, it is not possible to use hand positioning. Thus, existing software like Stop Motion Pro [4], [5], iStopMotion [6] or Dragon Stop Motion [7] are not relevant as they only can control camera settings and not camera moves. This section shortly reviews the state of the art for 3D animation of camera movements. We are aware of the following 3D animation software programs: Maya, 3DStudioMax, Lightwave, Blender, Cinema4D, Softimage, Houdini. These programs have two main tools to animate an object: "Keyframing Animation" and "Path Constraint Animation".

- "Keyframing Animation" is based on the traditional animation technique, where the user only sets the important frames, called keyframes, and, using interpolation techniques, the software program generates the intermediate frames, called in-betweens. The object's trajectory is internally represented as a

parametric space curve where the animator interacts with its three coordinate curves *x(t), y(t)* and *z(t)* in order to change position as well as speed. Note that position and speed can not be modified separately.

- "Path Constraint Animation" separately constructs the 3D space trajectory and the so called Ease Curve that controls the object's speed.

The main advantages and disadvantages of these tools are:

- Keyframing Animation:
o Separation of position and speed: Not possible
o Global/Local control of space trajectory: Only local control
o Addition of constraints: Possible
o Space trajectory's x-y-z-coordinates accessible: Yes
- Path Constraint Animation:
o Separation of position and speed: Possible
o Global/Local control of space trajectory: Only global control
o Addition of constraints: Partially possible
o Space trajectory's x-y-z-coordinates accessible: No

As far as the mathematical background is concerned there exist several interpolation techniques to fit a piecewise curve to a sequence of given points (keyframes), depending on the final motion desired. The most used techniques in animation may, e.g., be found in bibliography of [8]. In order to overcome the major disadvantage (dependence of position and speed) of the most popular animation technique, the "Keyframing Animation", several approaches aim at reparameterising the curve by arc length and thus controlling the movement along the curve by an Ease Curve, see bibliography of [8]. The author of [9] adds so called displacement functions in order to modify the space trajectory as well as the Ease Curve.

3. Experimental Environment for a New System

We present an experimental environment for a new system conceived to overcome the existing draw-backs of the traditional animation methods in 3D software animation programs. In particular we will focus on "Keyframing animation" and we will tackle the following issues: separating position and speed of the trajectory curve and proposing a representation that allows us to add constraints of real camera devices such as ranges for curvature, acceleration and deceleration. As recalled in section 2, the most used interpolation methods in animation give the possibility to control only first order derivatives at the junction points of the piecewise interpolant. To get a smooth trajectory curve that takes into account the constraints of a real camera move, every curve segment should be defined in terms of tangent and curvature vectors at its endpoints. To this end we consider the class of piecewise G2 continuous inter-polants where each curve segment is described either by a parametric Hermite quintic or by a rational Bézier cubic, like the one described in [10]. For the mathematical details see [8]. As concerns the prob-lem of separating position and speed of the trajectory curve we proceed as follows. Using existing nu-merical techniques (see references in section 2) we parameterise the entire curve by arc length, such that a unit change in the parameter value results in a unit change on the trajectory. See Fig. 1 for an il-lustration. Thus, by using the concept of the Ease curve, which represents arc length over time, we can choose the speed at which the curve is traversed, see Fig. 2. Moreover, also the acceleration curve is controlled (see Fig. 3).

Currently, an experimental environment to test our system has been implemented in *Matlab®*. Given a sequence of points and chosen the desired parameterisation, the program computes a G2 Hermite quintic space curve and gives the possibility to change the speed along the curve without modifying the trajectory. Vice versa, it's possible to modify the trajectory without changing the parameterisation. The points of the new parameterisation computed by *Matlab®* are given in input to 3D Studio Max by an external script and the new trajectory is visualized in the Motion curve window (see Fig. 1, right).

On the basis of this first step, our objective is to elaborate a system (e.g. by integrating the above process in an interactive interface in an animation program such as 3D Studio Max) that gives stop motion directors and animators full camera move freedom and respects the handwork visual aesthetic of stop motion. In particular we are aiming at the following system properties:

- The 3D animation part should allow to simulate a 3D camera move that can integrate constraints and imperfections (noise) of real camera devices (louma, steadycam, dolly, crane, etc.). The classical keyframe or path constraint animation should first be split in a position curve and a speed curve. Different parameterizations could then be applied separately to these curves and simulate, rather than imitate, the behaviour of a real camera device. The positions of the virtual camera should then be exported frame by frame to the motion control system.
- The motion control software, once these data have been imported, should allow to calibrate the motion control robot, to control the camera settings and, finally, to execute the sequence. It should also give some options to enhance creativity: frame by frame shooting for classic stop motion, automatic sequence shooting for timelapse, multiple takes with different camera settings for each frame (for HDR shots or Depth of field stacking).
- Last, the motion control robot should be affordable for any-sized budget production, handle a 2Kg camera, and have at least 1/10th of a millimeter precision for positioning and 1/10th of a degree precision for rotating.

We've already built two versions of the motion control robot. The first one moves on one translation axis and respects the required precision for a 300€ budget. Images of this robot and videos of several stop motion tests can be found at www.crealyse.com/recherche/dossiers. On the basis of this first version, a second "upgraded" robot has been built which is able to move on one translation axis and two rotations axes, respecting the required precision and for a 400€ budget. We are now working on the motion control software and tests have been scheduled for the next months.

4. Conclusions: Benefits of the Whole System Workflow

Computer graphics and SFX software have already simulated many cinematographic visual specificities to strengthen the illusion of reality: adding digitally generated motion blur, film grain, lens flares or glow let the spectator think that what he or she is looking at is real and not computer generated. Being able to simulate the influence of floor irregularities, human manipulations and mechanical imperfections of a camera device on a 3D camera movement would also contribute to the illusion of reality. Thus a motion control system specifically designed for stop motion would be a benefit for all types of stop motion productions: "specifically designed" means that it should be adapted to stop motion stages in terms of size and weight, accessible to any-sized budget productions and give animators enough control to stylize the camera movement. With an optimized workflow, such a system would significantly encourage creativity while respecting the handwork aesthetic of stop motion, intensify cinematographic illusion by giving life to camera and allow as much freedom for camera moves as on a real stage.

References and Notes:

1. Barry J. C. Purves, "Evolving into Stop Motion - Messing with Time," in Stop Motion: Passion, Process and Performance (Oxford: Focal Press, 2008), 11.
2. Ray Harryhausen and Tony Dalton, A Century of Model Animation (University of California: Aurum Editions, 2008).
3. Tom Gasek, "Imperfection in Animation," Stop Motion Works Web Site, http://www.stopmotionworks.com/imperftanim.htm (accessed August 18, 2011).
4. Stop Motion Pro's official Web Site, http://www.stopmotionpro.com (accessed August 18, 2011).
5. Mark Sawicki, Animating with Stop Motion Pro (Burlington: Elsevier, 2010).
6. iStopMotion's official Web Site, http://boinx.com/istopmotion/overview (accessed August 18, 2011).
7. Dragon Stop Motion's official Web Site, http://www.dragonstopmotion.com (accessed August 18, 2011).
8. Laura Saini, Nicolas Lissarrague, Gudrun Albrecht and Lucia Romani, " Stop-motion Animation: From a State of the Art to an Ideal Process," in Matapli 95 (2011): 37-52.
9. Scott Sona Snibbe, "A Direct Manipulation Interface for 3D Computer Animation," in Computer Graphics Forum 14, no. 3 (1995): 271–284.
10. Tim Goodman and B. H. Ong, "Shape Preserving Interpolation by G2 Curves in Three Dimensions," in Curves and Surfaces with Applications in CAGD, eds. A. LeMehaute, C. Rabut and L. L. Schumaker, 151-158 (Nashville: Vanderbilt University Press, 1997).

GUTAI MOVEMENT IN JAPAN AND ART AFTERWARDS. TOWARDS NEW UNDERSTANDING OF CURRENT MEDIA ART

Rie Saito

This paper will explore about GUTAI and Japanese avant-garde art especially concentrate on Atsuko Tanaka's 'Electric Dress' from cultural and sociological view to reconsider contemporary role of art and the relationship between culture and society. The paper will open a path to new understanding of media art in today's situation.

Is contemporary art still functioning as a role to propose an issue in a current society?In a complex world like today, it is difficult to answer this question and to think about the relationship between art and society. However, even under chaotic circumstances after postwar in Japan, there were specific intentions and certain art movements that took place, such as GUTAI, which is one of the most important movements that took at that time period. By focusing on this movement, it may enable us to rethink the practice of today's media art.

This paper will focus on Atsuko Tanaka (1932 – 2005) who expressed her artistic work in GUTAI during 1950's in Kansai, western region of Japan. The purpose of this paper is to investigate how the artist's personal catches and transforms to the public perspective.

Moreover, by reconsidering Tanaka's work as a prehistory of media art, the paper will particularly examine how postwar Japanese avant-garde art connect to today's media art. Especially, focusing on the work 'Electric Dress' will bring us a new understanding towards current media art in Japan.

In 1945, after the World War II, under chaos and desperation in the Japanese society, some artists tried different artistic work and activity to find the new world. GUTAI was one of these movements which happened in Hyogo prefecture in Kansai more than 500 km away from Tokyo. The artist Jiro Yoshihara formed GUTAI as a Gutai Art Association. In the first issue of GUTAI magazine, Yoshihara wrote a manifesto as below.

The most important thing for us is that present art is in the most liberal position for these who are living in this a severe time, because they deeply believe that the creation of freedom leads to human development. We earnestly wish to specifically indicate and prove that our sprits are free, and continue searching for fresh impression in every creation to the end. [1]

As described, the idea of GUTAI was to confront with the severe reality of the society and to conquer this situation. Atsuko Tanaka, who was active in Zero-kai emphasized this idea, and decided to participate in GUTAI officially. The first exhibition of GUTAI was held in June 1955 at Ashiya-city in Hyogo prefecture. It was an outdoor exhibition and Tanaka created 'Stage Clothes' which can be said the basis of 'Electric Dress'. There Tanaka made an enormous seven human figures and these figures had many colorful electric bulbs.

On October 1955, GUTAI held the first group exhibition in Tokyo. Tanaka exhibited one of her major work entitled 'bell'. Next year, October 1956, the second GUTAI exhibition was held in the same place in Tokyo and she placed her works on the show, including the 'Electric Dress'. Tanaka herself had put on the dress. In the famous photo of this work, her face shows obvious anxiety covered by the wrapping electricity. At that time, she had support from the electronic professionals to construct the electric dress,but there was certainly a risk for an electric shock. Tanaka herself says that she was a little bit scared. [2] This performance could be seen as insane. However, because she had put the electric dress on herself, the work was accepted with overwhelming existence.

Kato describes that in order to distinguish from all the others, Tanaka's 'Electric Dress' needed to cross over and transform the visual surfaces of the 'clothes / body'. Moreover, she considers Tanaka's 'Electric Dress' implies the general nature of clothing profoundly related to the formation of the 'self', which could also be expressed as 'Meta Clothes' by presenting a figure of continuing change in the body's image. [3]

According to Kato's opinion, Tanaka's 'Electric Dress' connotes various meaning about the body. Electric Dress is an extension of the body and it represents the body itself. The electric bulbs somewhat look like bone structure and blood, which have an uplifting image. However, the most critical point is the anxious face of Tanaka herself who actually controls the real body. She has an uncertainty towards her body but as an artist who tries to transcend this skepticism, the cloth, which is made from electricity, must have had a heavy strain. This is connected to Japanese traditional Kimono that wraps the body with many layers of fabric. Actually, when Kimono becomes a formal attire, the heaviness of the cloths constraints the body. Nevertheless, by bearing with this restraint, Kimono brings out its beauty as a dress. It can be considered that by putting her electric dress, Tanaka struggled to overcome the low status of female artist at that time and the burden from the society. When these personal issues forms as an artistic work, "Electric Dress" sublime as a crucial work that is still considered a remarkable piece until the present moment. One could feel her eagerness to create a new sensitivity after the defeat of war and the rapid transition of the society.

Today many contemporary artists create works which reflect a social issue where private and public sphere is ambiguous. Even more, they try to subvert the dualism itself. In the world where every issue can become a pop and mob, we are confronting the state which we cannot differentiate the reality and fiction in our daily life. In a situation like this, there is a lot of work that refer to virtualism or 'new' gender images of the body. It is clear that the body images change accordingly as time changes. When we look back to the work of Tanaka, it is notable that she was seeking the area where contemporary media arts were groping -- in the very early era of 1950's.

In addition, one must not miss that Tanaka was producing the 'Electric Dress' as stage clothes. In GUTAI's use of the stage in 1957, she made a performance called 'Stage Clothes". She changed her clothes continuously in this performance and the 'Electric Dress' recreated fluidity in space. Regarding 'Stage Clothes', Tanaka describes as follows.

This cloth start form the green cloth, the figure and the color of the clothes transform with rapid blinks of the electric light bulbs.

Electric Dress starts from small colorless bulb, then one hundred volt color bulbs, color pipe bulbs, bulbs which is covered by rigid vinyl and so on. Many figures, colors and lights of clothes appear blinking, and the tempo speeds up to a point where blinking lights look messed up.

What is interesting to me is that by blinking the electric bulbs with a motor machine, the electric bulbs that I myself set up turns with obsessive beauty that cannot be created by human's hand. [4]

From this, it is understandable that Tanaka focuses her attention to the change of time and brings her stage performance toward space to attract the audience. Her ability to construct the special atmosphere can be seen in her another work entitled 'Bell', her first GUTAI exhibition, which presents a blinking motor switch and continuous sound of the bell.

As just described, Tanaka's work is not just using the newest technology but it is a pioneering experiment by using the electric media to create an artistic work at that moment. Moreover, her skills to change small object into dynamic dimensional work is extremely avant-garde and still gives unjaded impression to us.

Unfortunately, Tanaka's work could not be appreciated by the right in Japanese art scene. Her work may have been too radical and awe-strike for the new born of art. However, person from overseas who is related to the art world such as the French critic, Michel Tapié, gave her a reputation. Nonetheless, a sequence of GUTAI's activity and Tanaka's work gave an enormous encouragement to Japanese media art afterwards. They cultivated its pioneer spirit, avant-garde motivation and the quest for new beauty.

In 1960, Tanaka contributes articles to the magazine titled "Search for an Unknown Aesthetic" which states:

The new artistic work has to create different beauty that past works already have. Repeat of presenting already existing beauty is a kind of handwork by craftspeople. I think person who tries to create art has a responsibility to find unknown beauty and set it in place.

Everyone can paint on a canvas and it is totally free to express anything. The most interesting thing is to draw the thing, which nobody knows, including myself. [5]

If contemporary art still respond to the complex society and create new work, this text most directly expresses the situation. We are now surrounded by the confusion and anxiety as if it is postwar, but we are still trying to find a faint glimmer of hope. In such circumstances, conflicts are natural and many work will express embarrassment and delusion. However, unfazed attitude to search for a new art will bring out hope that will brighten the present and future with self-reflection. Now in Japan after the disaster of March 2011, this movement is slightly seen. Japanese contemporary art nourished the spirit to move people's feelings even if it is made of a very simple structure. From this point of view, Tanaka's 'Electric Dress' will be reappraised as a pioneering piece.

References and Notes:

1. *Jiro Yoshihara, "Gutai Manifesto," in Gutai Journal 1 (1955).*
2. *Tokutaro Yamamura and Shinichiro Osaki, "Interview: Akira Kanayama – Atsuko Tanaka" in DOCUMENT GUTAI 1954-1972, 396-402 (Ashiya: Ashiya City Museum of Art and History, 1993).*
3. *Mizuho Kato, "Searching for a Boundary," in Atsuko Tanaka: Search for an Unknown Aesthetic 1954-2000 (Ashiya: Ashiya City Museum of Art and History, 2000), 6-14.*
4. *Atsuko Tanaka, "Work 11 Stage Clothes," in Gutai Journal 7 (1957).*
5. *Atsuko Tanaka, "Michi no bi no Tankyu," in Geijutsu Shincho 11, no. 1 (1960): 271-272.*

MOMENTS OF LIMINAL SPACE: METHODOLOGIES AND PRACTICES FOR THE STUDY OF TRANSITION

Melissanthi Saliba

The waiting room of a train station is a space lost in time where I go to observe strangers. The waiting body becomes the threshold between the everyday experience of public spaces and the unexplored territory of subjective motional states and gestures. Moments of Liminal Space is an installation of rhizomatic portraits composed of video, prints and writing, mapping the waiting body, withdrawn from its everyday functional state.
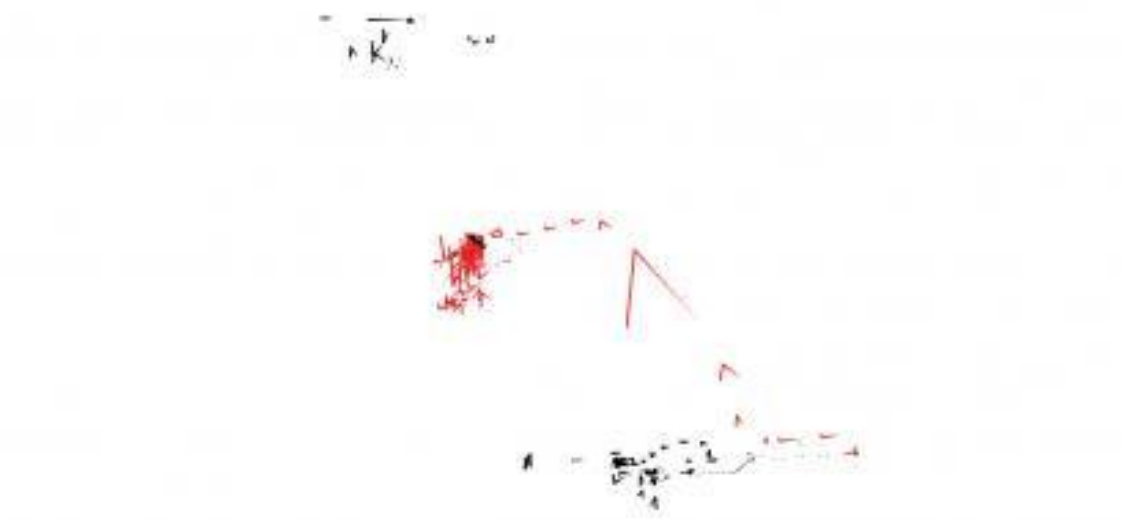
Fig 1. 525 Seconds Spent Together, 2010, Melissanthi Saliba, Inkjet Print, 45x34 in.
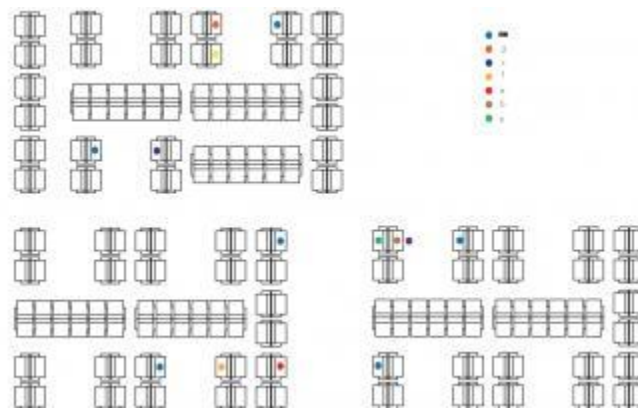
Fig 2. People I have waited with and me. Diagram of the Waiting Room in the Los Angeles Union Station, 2010, Melissanthi Saliba.

The waiting room of a train station is a space lost in time where I go to observe strangers. The waiting body becomes the threshold between the everyday experience of public spaces and the unexplored territory of subjective motional states and gestures. *Moments of Liminal Space* is an installation of rhizomatic portraits composed of video, prints, sound and writing. The waiting body, withdrawn from its everyday functional state, reveals the microgeography of the space that surrounds it. The project brings into attention the purposeless forgotten gestures of waiting, addressing their need for representation. *Moments of Liminal Space* suggest a subjective tracing and mapping of different ways by which individuals move in space.

The seemingly unimportant, the marginal, and the unintended gestural activity is placed in the center of attention as an experience that will reveal the spatiotemporal nature of contemporary public spaces. Movements of the body and gestures that aim almost solely at releasing physical and psychological pressure (adapters), become the rhythmic measure of time and space and reveal the ways by which individuals occupy and experience space.

The condition of being in transition between different locations, during which the waiting occurs, happens in spaces where bodies are prepared to exit the home of a culture and transfer to another place, often unfamiliar to their previous experiences. Los Angeles Union Station, constructed just before the end of the railway's heyday, is the setting for studying *Moments of Liminal Space*, considering it's role as an archetype for in-between spaces.

This in-betweenness renders *liminal space* the land where the rigid structures of consciousness retreat and the Self opens up to the Other, the unknown potential of the waiting, the unconscious, the foreign territory that often controls the Self. The body under this condition becomes objectified and exists as part of the space. *Moments of Liminal Space* explores the waiting of strangers as an activity of the 'here' and the 'now.'

The slippery, momentary gestures of waiting, lacking of meaning, suggest a cultural sensibility based on the premise that the Self is a stranger. These movements are captured through the lens of a video camera, and then tracked and translated into 'data' that are 'expressed' rather than visualized through different media forms. Print, writing, video documentation and video animation are platforms used for the composition of waiting portraits.

The installation of the different parts of the artwork in space, establishes interconnectedness, a necessary condition for unfolding the *liminal*. It is through the different connections made by the viewer that meaning and form are interwoven. Waiting produces 'data' that can be interpreted in subjective ways and their expression becomes an attempt of factless portraiture that is focused on human experience rather than visualization through the knowledge of events.

The waiting body has its own movement rhythm, that escapes attention as an activity that happens in the background of everyday life. This point of entry to *Liminal Space* calls for the abandonment of knowledge in the sake of experience, through measuring that can only rely on the human senses and "geographies of human agency." (Pile 1996:48)

TOWARDS A LIMINAL DEFINITION OF WAITING

The *liminal* interprets the movements of the waiting body as *lapsi corpi* (slips of the body). In analogy to the role of the *lapus linguae* in Freudian methodology, the almost purposeless movements of waiting, can reveal concealed states of the body and the human condition of individuals. Waiting, interpreted as an error, can reveal moments of a bodily epiphany, becoming an activity that allows the body to either withdraw from the constraints of public space, or to collide with them by failing to obey. Thus, the *liminal*, becomes a condition in which body language can escape meaning and unfold in a form which retains its independence from external points of reference and rules of social discipline.

Waiting inherently takes place before something scheduled happens, and in that sense, it is a liminal activity similar to the speculative execution of code from computers. Speculative code ascribes to the computer processor improvised tasks that have no reference and are irrelevant to the 'main' program that is just about to happen. The reason for the execution of speculative code is keeping the processor on the right track, in terms of the sequence and the timing of the programmed computations.

The aesthetics of the improvised, the error, the unnecessary, the failure, are elements that the *liminal* system uses to its advantage. The *dérive*, as the act of purposeless drifting, offers the possibility to escape rationally defined and calculated space supposedly designed to achieve the highest level of efficiency in production and functionality. In the 1950s and 1960s, the *Situationists* proposed a strategy they called *psychogeography* to study and embrace *liminal* space, emphasizing the notion of experience as opposed to knowledge. Waiting as a set of unintentional of gestures in space is a strategy resisting the vertical organization of meaning production.

Moments of Liminal Space focuses on waiting in order to map spaces through the movement of individuals. The unintended gesture is translated into 'information' through its tracking, and space is visualized as a dimension that opens up through these movements. The print work, explores the spatial dimension of waiting, through the position of the captured bodies. The duration, the frequency and the intensity are factors taken into consideration for the visualization of the movements. Waiting is approached as a drifting activity, a condition during which the body 'fails' to produce meaning, exposing its own image to the viewer.

Aharon Kellerman, writing about personal mobilities uses the term *homo viator*, to refer to human beings as constantly moving entities in both society and space (Kellerman 2006:1). Under the conditions of our new constantly mobile existence, the Self and the Other is deconstructed and reconstructed in motion. *Supermodernism*, a term introduced by the anthropologist Marc Augé, has appointed the transitory spaces as highly important in the context of the contemporary globalized condition. These are the spaces where one can encounter strangers, an experience that contemporary anthropology considers as rather valuable. Marc Augé refers to these spaces under the name of non-places:

If a place can be defined as a relational, historical and concerned with identity, then a space which cannot be defined as a relational, historical, or concerned with identity will be a non-place. The hypothesis advanced here is that supermodernity produces non-places, meaning spaces which are not themselves anthropological places (...). (Augé 1995:78)

What Marc Augé calls *supermodernity*, seems to produce spaces which are at least 'relational' and 'concerned' with identity. The main difference that separates transitional spaces from the so-called anthropological, in the traditional sense, would be that meaning today is, most of the times, not superimposed. On the contrary, meaning in waiting spaces is created through the interrelations taking place within them. Places are spatial entities that exist on fixed points, whereas the transitory condition of non-places seems to relate more to a sensibility formed around space.

The waiting body is open to space through its senses to the point that it becomes strange and withdrawn. Phenomenology has offered an insight to the relationship between the human body and the space by focusing on experiential aspects. Part of The *Fundamental Concepts of Metaphysics* is devoted to boredom. Martin Heidegger begins his exploration by the hypothesis that a number of people are waiting inside a train station, and through this example he is trying to define the ways by which the waiting body is experiencing this condition. He speaks of the undefined, unexplained, and unjustified reasons that cause waiting to be boring. Through the unfolding of his thoughts, he presents the mechanisms and dynamics of waiting as processes that undermine consciousness. The idea of indifference is one of the central points of his thought:

Each and every thing at once becomes indifferent, each and every thing moves together at one and the same time into indifference. We no longer stand as subjects and suchlike opposite these beings and excluded from them, but find ourselves in the midst of being as a whole i.e., in the whole of this indifference. Beings as a whole do not disappear however, but show themselves precisely as such in their indifference. The emptiness accordingly here consists in the indifference enveloping beings as a whole. (Heidegger 1895:138)

The eventlessness of waiting renders the incision of time impossible. The mind cannot divide the experience in units, and along with that impossibility, comes the failure to divide the Self from the space, as the subject can no longer discern spatiotemporal progression. Every moment is equal and identical to every other one. The subject uses the capacity of the observer to define a point of view that retains a relationship to real space and time. The condition of waiting brings about the loss of self-image and eventually the transformation of the subject's perspective that remains detached from the rest of the world. The direct signal in the communication between the body and the environment is lost and under the condition waiting self-image can only be constructed through the Other.

LIMINAL SPACES AND THE RISE OF THE SEMI-PUBLIC

Los Angeles' Union Station is often being mentioned as "the last of the great stations." The reason for this distinct title was the fact that it was built exactly after the railway had reached its glorious period at the threshold of the 20th century (Bradley 1989:6). Union stations were stations where passengers could transfer from the trains of one railway company to the other. Eventually, these venues became nodal points, both for travelers and citizens.

The study and discussion around railway stations often draws comparisons between these spaces and other establishments that are loaded with great significance for the members of a community. People often compare the major stations of this period to cathedrals. The church is the archetype for all networks as it was the first medium that penetrated in full success most of the forms of human communities. It is not surprising that any network technology that shares similar goals would borrow elements of church culture. Murray Schafer, while referring to sacred sounds writes the following about railroads:

In the Middle Ages it was church bells that rang constantly, to which was later added the organ, the loudest machine on earth prior to the Industrial Revolution. During the early part of the 19th century, however, the Industrial revolution replaced the churches, and railroads carried industrial noise throughout the countryside.

Sound can define the limits of a community; exiting the range of the church bell could be synonymous to de-parting from a community, while exiting the range of the railway could be a retreat from civilization altogether. Railway was the most internationally spread travel network, it was an the equivalent of today's airways. Probably because of the hours that passengers would have to wait for their train it seems that the 'comfort' factor was an important one. In waiting rooms, habits belonging to private spaces would occur frequently. Passengers could rest, sleep, occupy space in more comfortable ways, to the extend that the opposite sex was excluded. Segregation, apparent in the waiting between two different locations, is implied by architecture. Sketches and floor plans of railway stations reveal spatial separations that reflect cultures and mentalities from the end of 19th and the first half of the 20th century.

Besides from the revival of Gothic architecture –seen as a religious style– reflected in the high ceilings,

the tower-like structures, the cathedral windows and other structural elements of railway stations that implied analogous interrelations of people in space, there was also an integration of Roman architecture. Roman baths were particularly inspiring spaces for some of the architects who designed railway stations. New York's Pennsylvania Station was modeled after the baths of Caracalla and the Washington D.C. station was inspired by the baths of Diocletian, both typical examples of Roman architecture. Public bathing, a quotidian Roman habit, was part of a culture revolving around the care of the body. Baths were spaces open to everyone, where an intermingling between the public and the private, would take place. The public aspects of these spaces were relevant to the role of the state, which involved the care for the citizen's body, but also the discussions that would take place there, concerning -amongst others- political issues. In addition, Roman baths have been acknowledged as a space where every man, including slaves, was equally privileged (Crowther 2007:98).

The architectural elements that architects used to design railway stations drawing from Roman baths were both formal and structural. Monumentality is the main element, as Roman baths meant to honor the emperor (Crowther 2007:95). An important characteristic that this influence could provide was the coexistence of the private and the public. These architectural references would establish the monumentality and meaning that was not widely apparent at the time within the function of the railway stations. Meaning in civic places is mostly obtained by their importance for the city, defining the difference and autonomous value of the city to others. Terminals acquire their importance from the potential of transition that they offer. Their importance lies on the indefinite interrelations that they can create between the City -the Self- and the Other. Terminals are spaces constantly referring to the absent Other rendering thus the construction of meaning around them an ironic and hard task. Waiting, before transitioning to an unknown destination, can create a state of openness, an in-between land where one is in the process of leaving the familiar culture and opening up to a new and unknown one.

CONCLUSIONS

The *liminal* suggests the exploration of the Self and the Other within the 'here' and the 'now'. This contemplative position is rooted within a condition of 'being' where time cannot be divided in past, present and future as it can only unfold through its contemporaneity. The gaze of *liminal* geography is excluded from the sphere of super-vision, as it involves the activity of wandering and encountering strangers, rather than the supervision of others.

The *liminal* takes place in transition and reveals ideas that can be seen only within the blur of mobility, presupposing the detachment of meaning from places and the emergence of spaces. To understand while being in transition is to abandon the condition of certainty connected to the already known that exists in fixity. *Liminal* time is eventless and microscopic, generating docu-fictional narratives, rather than documenting the significant. Meaning is relational, deriving from connections that are drawn between different points of observation and multiple forms.

Waiting engages with the everyday, the casual and the anonymous. As strangers withdraw from the sphere of language and meaning, the body becomes the actor. Through the movements of waiting, the body transforms into an object, becoming the visual abstraction of a functional and meaningful entity, allowing for the purposeless gestures of waiting to take place.

Liminal aesthetics suggest the reinvention of the Self as a stranger among other strangers. The encounter and the embrace of the unknown allow for a gaze eager to explore space through experience and engage with different cultures as equals. The absence of scientific premises and conclusions suggests a participatory geography where people are invited to interpret space using their own points of reference and their imagination.

References and Notes:

BOOKS

Augé, M., Non Places: Introduction to an Anthropology of Supermodernity, trans. John Howe (New York: Verso, 1995), 78.

Bradley, B., The Last of the Great Stations: 50 Years of the Los Angeles Passenger Terminal (Glendale: Interurban Press, 1989), 6.

Crowther, N., Sport in Ancient Times (Connecticut: Praeger Publishers, 2007), 95 & 98.

Heidegger, M., The Fundamental Concepts of Metaphysics, trans. William McNeil & Nicholas Walker (Bloomington: Indiana University, 1995), 138.

Kellerman, A., Personal Mobilities (London: Routledge, 2006), 1 .

Pile, S., The Body and the City: Psychoanalysis, Space and Subjectivity (London: Routledge, 1996), 48.

Ponty, M. M., Phenomenology of Perception, trans. Colin Smith (London: Routledge, 1962) .

Schafer, M., I've Never Seen a Sound (Lisbon: Twelfth International Congress of Sound and Vibration, 2005), 3.

EDITED BOOKS

Debord, G., "Theory of the Dérive", in Situationist International Anthology, trans. Ken Knabb (Berkley: Bureau of Public Secrets, 1955).

JOURNAL ARTICLES

Billington, D. & Mark, R., "The Cathedral and the Bridge: Structure and Symbol," Technology and Culture 25, no. 1, Johns Hopkins University Press, (1984): 38-39.

FASHIONABLE WEARABLES IN DIGITAL PERFORMANCE

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This paper explores how fashionable wearables affect digital performance, stressing the sensual and embodied abilities of electronic arts. Focusing on the notion of 'wearable performance', this study explores its link to the theory of remediation, providing a conceptual framework that includes re-embodiment, digital bricolage and interdisciplinarity as the effects of fashionable wearables in digital performance.

Introduction

Proceeding from the notion of the 'wearable performance,' [1] this study stresses the display and performative aspects of wearable technologies in the performance context. In particular, performative garments generate digitally mediated events in the wearable space. Revealing digital performance as an interface of creative activity, this paper analyzes how wearable performance remediates digital performance, enabling three particular effects: re-embodiment through the wearable space; digital bricolage as artists' experimentation with wearable technologies; and interdisciplinary collaborations that provide new creative structures for the wearable performance.

The first part of this paper presents the current trends in fashionable wearables, highlighting key theoretical points, [2] [3] while the second part focuses on digital and wearable performance. [4][5] [6] The third part introduces the theory of remediation, [7] presenting re-embodiment, [8] digital bricolage [9] and interdisciplinarity; [10] which are further discussed in the next part, while tracking future research implications.

Fashionable Wearables

In 2000, Sabine Seymour introduced the term 'fashionable technologies' in order to describe wearables that rely on the intersection of design, fashion, science and technology. By coupling expressiveness and functionality, fashionable wearables fulfill high aesthetic and stylistic requirements, in contrast to the weirdness of wearable computers, incorporating electronic textiles and smart garments. [2]

Electronic textiles, including technically enhanced textiles enabled for sensing, communication, power transmission, and interconnection, and smart garments, which can "sense stimuli in the ambient environment…see and smell on behalf of the wearer," [3, p. 12] create new standards of "wearability, comfort and aesthetic"; acting as embedded interfaces that contain microprocessors, sensors, actuators, software or intelligent materials. [2, pp. 15-16] Thus, fashionable wearables emerge as an interface between the body and the environment, able to communicate and interact with other digital agents. [2]

In particular, fashionable wearables can take the form of 'interactive interfaces' that electronically change surface patterns, based on embodied or environmental stimuli. [2] [3] As interactive interfaces they require inputs, outputs and the ability to communicate with digital media. Inputs include textile or

embedded sensors that capture data from the body (blood pressure) or the environment (light or humidity). Outputs are usually technologies that can be seen (Light Emitting Diodes/LEDs), felt (heating), touched (conductive fabrics), heard (speakers), and smelled (scent capsules); while the ability to communicate refers to technologies such as ubiquitous computing and wireless communication (WIFI, GPRS, RFIDs). [2]

Fashionable wearables can also sense human emotions, as 'emotive interfaces' that capture and broadcast feeling and mood. [3] Based on artificial intelligence that recognizes emotions such as "anger, fear, sorrow and joy", an emotive interface visually broadcasts our emotions, resulting in changes in the wearables' surfaces and/or forms. [3, p. 22] For instance, fashionable wearables "can identify the increased heartbeat and the perspiration that accompany fear as easily as they can record changes in the wearer's health." [3, p. 24]

While fashionable wearables' applications range from medical applications or electronic fashion, this paper concentrates on digital performance, focusing especially on the wearable performance. [1]

Digital Performance

Although technologies have intersected with theatre and performance since their very beginning, [4, p. xxii] digital performance mainly flourished throughout the 1960s as an effect of the "cross-fertilization between theatre, dance, film, video, and visual art", based on interdisciplinary collaborations between artists and scientists/engineers, [11, pp. 32-33] Digital performance, also known as multimedia performance or performance art, is an art form that includes "all performance works where computer technologies play a key role rather than a subsidiary one in content, techniques, aesthetics, or delivery forms." [4, p.3]

In some cases, digital technologies are highly visible to the audience but not interactive with the performers, usually taking the form of video projections or sounds; [4] while in other cases they are invisible, applied as digital tools in the design of a digital performance. [6] However, digital technologies usually generate various forms of interactivity between performers and digital artefacts. For instance, Cunningham's digital performance 'BIPED' (1999) engaged dancers' interaction with pre-designed digital forms produced in a studio based on 3D motion-capture software. [4]

In addition, alternative forms of interactive digital performances explore interactivity between performers and live-created abstract digital images called 'sprites', which are created by a performer-operator on a graphics tablet and are instantly projected on stage. [12] Other modes of live-created digital artefacts include effects such as the digital double, the digital twin of the performer's figure captured by digital media and projected on stage; performance in virtual environments; or the distribution of choreography among different locations. [4] Thus, digital performance engages with various forms of interactivity, whilst still sustaining an external relationship between the performer and the digital artefact.

Wearable technologies emerge as an additional stream of experimentation in digital performance, enabling an internal relationship between the performer's body and digital technologies, as they manifest "the transition between the inside (biological/emotional) and the outside (gesture and movement with the smart materials/garment) which affect the visibly and audibly revealed (screen and sonic architectures)." [1, p. 106]

Despite the early attraction of performers to experimenting with wearable technologies, these initial applications only incorporated wearables as flexible surfaces for digital display. [11] Later explorations in the field of electronic music performance integrated the sensing technologies of wearable computers with digital performance. For instance, in her project 'Ladies' Glove' (2004), performer-musician Laetitia Sonami "turned their bodies into alternative 'controllers', translating real-time flesh-and-blood movements into synthesis parameters through wearable sensors, carried objects, maladjusted instruments, and augmented outfits." [6, p. 217] Through gestures, these technologies experimented with broadcasting internal aspects of the performers, causing them to be visibly and audibly revealed. [1]

Focusing on wearable technologies in digital performance, Birringer and Danjoux (2009) coined the term 'wearable performance', distinguishing display and performative/interfacial garments. On one hand, display garments make wearables part of performance's digital environment, by broadcasting on their surface the performers' embodied conditions and environmental stimuli, or the audience's reactions, based on various programmed patterns. On the other hand, performative/interfacial garments operate based on a sensorial embodiment that senses the performers' bodies and actuates changes in the digital environment. Performative garments enable the 'wearing of space', performing real-time patterns based on embodied and environmental stimuli. [1]

Projects on the wearable space experiment with sensory technologies, and the connectivity between the wearers and their affective environments. For instance, Kozel and Schiphorst's project 'exhale' (2006) used sensors to capture the breath patterns of wearers, which were projected onto their wearables (self-to-self interaction) or onto those of other participants (self-to-other interactions) as vibrations and fans. The wearables were also able to capture the collective breathing patterns of a group of participants, translating them into visible or audible representations on wearables or other devices. [5]

Birringer and Danjoux (2009) stress that designing for the wearable space requires new perspectives that exceed 2D/3D design. Their research project 'design in motion' introduced a new design approach that fostered the development of wearables based on interdisciplinary practices that share elements from films, architecture, or dance; as well as digital art and interactive installations. The concept of design in motion springs from the "collaboration between choreographer, designer, digital artists, composers and engineers", and "focuses on the real-time relationship between the tactile performance experience of the garments and the projective visual and acoustic/sonic visual environment." [1, p. 98]

Fashionable wearables, and especially the wearable performance with its performative garments, have had a unique impact on digital performance; shifting the performers' external interaction with digital artefacts into an internal relationship that integrates wearable technologies as digital extensions of their bodies. This paper analyzes this impact based on the theory of remediation, providing a conceptual framework of the field by identifying three effects of fashionable wearables in digital performance.

Remediation of Digital Performance

The concept of remediation describes "how new media forms emerge from older ones," [7, p. 83] based on two opposing interface design strategies: 'the strategy of transparency' and 'the strategy of reflectivity'. Transparent interfaces deliver information to users with clarity, accuracy and efficiency, while reflective interfaces aim to generate an interactive and compelling experience. As no digital design can achieve pure transparency or reflectivity, all interfaces share both transparent and reflective elements. [7]

Digital performance reveals interface qualities, delivering information in terms of transparency and generating interactive experiences between the performers and the digital artefacts. In particular, digital artefacts, such as pre-designed forms or digital doubles, require effective transmission and display of data; while reflectivity shapes the ontology of digital performance as an interactive experience and integrates it with these digital artefacts. In general, digital performance emerges as an interactive interface that remediates non-interactive forms, exploring various forms of interactivity that drive the evolution of interactive digital performance.

However, wearable performance remediates further digital performance, introducing the performative interface that links the performers' senses, the stage's architecture, and, in some cases, the audience with real-time compositions on the wearable space. [1] [5] [7] The performative interface incorporates transparent characteristics, stressing the functional dimensions of the affective and sensing technologies that maintain effective communication between the inside and the outside, as well it demonstrating reflectivity as a responsive co-performance of performers and fashionable wearables in real-time. [1] [7]

In particular, the remediation from the interactive to the performative interface causes three particular effects: (1) re-embodiment, (2) digital bricolage, and (3) interdisciplinarity.

(1) RE-EMBODIMENT

Hansen [8] introduces embodiment, disembodiment and re-embodiment as three interrelated terms that describe the integration of the body with digital technologies. Embodiment is the process that enables the body to generate informational objects, such as images, space and events; disembodiment is the process that captures and transmits embodied data across different digital agents, transforming the body into a 'body-in-code;' [8] and re-embodiment is the "convergence of technology and the body that facilitates the extension of the body into other dimensions." [13, p. 77]

While embodiment and disembodiment are evident in interactive digital performance, such as in the cases of digital double or distributed choreography, the performative interface is only realized through re-embodiment, which considers fashionable wearables to be an indispensable digital extension of the performers' bodies. [13] Re-embodiment becomes the necessary condition for the generation of the wearable space that shapes the wearable performance's reflective experience. [8]

(2) DIGITAL BRICOLAGE

While bricolage derives from "the remixing, reconstructing, and reusing of separate artefacts, actions, ideas, signs, symbols, and styles in order to create new insights or meanings," [9, p. 70] digital bricolage of wearable performance exceeds the mere aesthetics and style of fashionable wearables, indicating design for the wearable space.

Digital bricolage indicates a new stream of digital experimentation in digital performance, as well as a process that invites performers and designers to interact with fashionable wearables in order to shape them as performative interfaces that demonstrate functional, aesthetic and performative qualities in the wearable space. [2] Digital bricolage requires a new combination of professions, skills and methods that remediate the creative process of digital performance; paving the way for new challenges, such as how to design for the wearable space.

(3) INTERDISCIPLINARITY

Interdisciplinarity is defined as cross-discipline integration and communication, aiming to produce context-specific knowledge through new structures and collaborations. [10] In fact, interdisciplinarity has been evident in digital performance since the 1960s, sharing skills and knowledge between the domains of art, engineering, and science; as well as important cultural organizations and academia. [6] In wearable performance, interdisciplinarity establishes new collaborations that integrate fashionable technologies and digital performance, mixing skills and practices in order to create the performative interface. [1]

Furthermore, the interdisciplinary integration of fashionable technologies and digital performance results in a mutual ontological impact between disciplines that affects their evolution. [10] Wearable performance represents the ontological impact of fashionable wearables on digital performance; while the introduction of the performative along with functionality and aesthetics comprises the ontological influence of digital performance on fashionable wearables.

Discussion

Fashionable wearables remediate interactive digital performance into wearables performance, resulting in significant effects on the creative practice. The wearable performance enables transparent qualities in terms of functionality and effective communication among the responsive network; while reflective qualities link the performer's senses and embodied conditions with the audibly and visibly perceived. Ultimately, wearable performance emerges as a novel mode of digital performance, as the performative interface remediates the interactive, effecting re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment remediates the performer's body, which is realized as a performative interface in mixed reality as flesh overlaps with digital technologies. [7] As fashionable wearables become the digital extension of human senses and the performer's body, re-embodiment enables the body to become an active digital agent shaping a visible, sonic or sensual experience that functions in terms of an affective network. [8] Re-embodiment results in a shift of focus of digital performance from the external interaction performer/digital artefact into the internal interaction of performer/wearable that transforms the body into an interface linking emotions and expressions to the wearable space.

Digital bricolage remediates the process of designing for the digital performance. Interactive digital performance seeks design principles that capture and display digital artefacts on stage, while integrating them with the performers' bodies. In contrast, wearable performance, through the process of digital bricolage, aims to design for the wearable space; and therefore seeks novel design practices that integrate different disciplines and methods, such as the concept of design in motion developed by Birringer and Danjoux (2009), which aims to create for the performative interface. [1]

Interdisciplinarity collaborations remediate digital performance as new structures which are formed to create for the wearable performance. By challenging the role of the choreographer as the artistic originator of digital performance, wearable performance introduces new roles, such as the fashionable wearables designer, which collectively compose digital performance. [6] Through the ontological effect of interdisciplinarity, [10] elements from other disciplines, such as digital art, are also expected to infuse digital performance.

Finally, the application of fashionable wearables in digital performance revisits the theory of remediation, and especially the notion of reflectivity as the only alternative to transparency. While the performative interface emerges as a form of enaction that exceeds the external character of reflectivity and interaction, re-embodiment merges the live with the digital in a state of mixed reality. [4] In particular, wearable performance demonstrates the performative that implies "a world in which subjects and objects have not yet come into being, and even if materialized, are always in a constant state of flux and transformation that is unstable and difficult to repeat." [6, p. xxvii] This notion of the performative emerges as a key element in the design of fashionable wearables in digital performance; at the same time challenging the theory of remediation by the introducing the performative as an alternative or more refined version of reflectivity.

Future Implications

Future implications can focus on the development of case studies of wearable performances, surveying diverse forms of remediations and performative interfaces. Springing from the new performative qualities of wearable performance, future studies can also focus on the intersection of fashionable wearables with other digital design fields, such as interactive architecture. An additional future implication can study the performative interface in real-life context beyond digital performance, capturing broader cultural implications of wearable technologies in contemporary life.

Conclusion

Fashionable wearables remediate digital performance, shifting from interactive digital performance that enables the performers' external interaction with digital artefacts to wearable performance that enacts the performers' internal interaction with wearable technologies on the wearable space. In particular, this remediation results in the emergence of the performative interface that causes three particular effects in digital performance: re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment generates wearable performance as a new type of digital performance that places the body and fashionable wearables as its indispensible extension, at the centre of all experience. Digital bricolage introduces new processes in the design of the performative interface, as the development of fashionable wearables becomes a new stream of digital experimentation for the wearable performance. Interdisciplinarity provides new structures of collaboration that integrate diverse professions, skills and methods.

Interdisciplinarity facilitates the ontological impact of the contributing disciplines. While wearable performance emerges as the ontological effect of fashionable wearables in digital performance, the performative is expected to infuse the development of fashionable wearables in addition to functionality and aesthetics, as a spin-off from the wearable performance. Finally, the study of wearable performance contributes to the theory of remediation, revealing the performative to be an alternative or more refined version of reflectivity.

References and Notes:

1. Johannes Birringer and Michèle Danjoux, "Wearable Performance," in Digital Creativity 12, no. 1-2 (2009): 95-113.
2. Sabine Seymour, Fashionable Technology (Vienna: SpringerWienNewYork, 2009).
3. Bradley Quinn, Textile Futures (Oxford-New York: Berg, 2010).
4. Steve Dixon, Digital Performance (Cambridge, MA: The MIT Press, 2007).
5. Suzan Kozel, Closer (Cambridge, MA: The MIT Press, 2007).
6. Chris Salter, Entangled (Cambridge, MA: The MIT Press, 2010).
7. Jay D. Bolter and Diane Gromala, Windows and Mirrors (Cambridge, MA: The MIT Press, 2005).
8. Mark B. N. Hansen, Bodies in Code (London-New York: Routledge, 2006).
9. Mark Deuze, "Participation, Remediation, Bricolage: Considering Principal Components of a Digital Culture," in The Information Society 22, no. 2 (2006): 63-75.
10. Georgina Born and Andrew Barry, "Art-Science: From Public Understanding to Public Experiment," in Journal of Cultural Economy 3, no. 1 (2010): 103-120.
11. Michael Rush, New Media in Art (London: Thames & Hudson, 2005).
12. Sita Popat and Scott Palmer, "Embodied Interfaces: Dancing with Digital Sprites," in Digital Creativity 19, no. 2 (2008): 125-137.
13. Pramod K. Nayar, An Introduction to New Media and Cybercultures (Chichester: Wiley-Blackwell, 2010).

SOCIAL MEDIA AS ART AND VS ART

Manthos Santorineos & Stavroula Zoi

WWW space has always been an attractive space for artists, providing a virgin area for discovery. Gradually it was filled with shops, newspapers, maps, advertisements and became everyone's daily routine. Where does the artist stand in this situation? As visitors' animator through the social web? In the compromise in order to be included to a new populous and commercial Internet? Or in the exploration of virgin areas on the edge of the WWW?

Introduction: From the Heliocentric System of Copernicus to the Google Earth

The heliocentric system of Copernicus, in the16th century, modifies human thinking, by posing as a basic principle that neither the Earth, nor her Inhabitants are the center of the world. In the era of Google Earth, four centuries later, the system of the World Wide Web (WWW), by embracing (webbing) the Earth, overturns the established Copernican perception of the world. There is not one central system – as western culture defines it- but a grid of central and non-central systems, interconnected in a dynamic way.

It's a new image of the world, even more complex than modern physics' spatiotemporal views. Apart from time and space, it involves concepts such as information in the form of metadata, real time actions, dynamic files, and complex actions of human-machine combinations.

In the era of the "Google-Face-Booking Earth", it is necessary to reconsider the problems of globalization refreshing the arguments of the last decade. It would be interesting to consider the argument of Peter Sloterdijk about the historical perspective of globalization [1] and to reflect upon the new situation that is shaped by the wide participation of people in the Internet Galaxy, through the Social Web. This new situation could be related to the prospect of a new artistic or philosophical view of the world. This is the point of the emplacement of the artist and the question that rises is whether this new situation has been formulated from the artistic perspective.

The Real Space of Web

In order to develop our view on the matter, it would be useful to have a thorough study on the environment in which it unfolds, namely the WWW. It can be divided into five periods.

FIRST PERIOD: EXPLORERS, PIONEERS, ACTIVISTS

The WWW from its very first days has been an attractive space for artists. It provided a virgin area of unknown characteristics, dispensable to be discovered, with anticipated adventure and new opportunities, an area that had not been mapped, therefore an open space for a new beginning. Artists, professional pioneers as they are (or addicted to the avant-garde), found interesting the exploration of the new

world (wide web) and fascinating the ideas of the (virtual) terra incognita. To those familiar with technology as an expressive tool, it was the perfect place to develop their artistic, conceptual or social behavior. It was a place in which they believed that, they could inexpensively build their own ideas and to set their rules.

It is from the world of Art that the first name and description of this new space (the web space) was given. It is to literature that we owe the term "cyberspace" (William Gibson Neuromancer 1984). It is also literature that mystified the new space to an extent that the artists, youth, and people who like adventures, consider it as their own space.

The first inhabitants of cyberspace, originating from the world of art, as well as programmers who considered programming as creation, were characterized as web or (Inter)net artists, and shaped the web's initial form. Later came web designers, practicing an applied media art, related mostly with manipulated images, sounds and texts. The Web designers, drift from older techniques of design, tried to create an impressive picture, but soon the technological developments overcame the culture of printed materials: the internet was much more than a well-made layout surface.

SECOND PERIOD: THE RELOCATION OF THE COMMERCIAL REAL-WORLD ON THE INTERNET

Real explorers formed a community of cursed, adventurers, or romantic revolutionaries such as those of the 18 century, in the new American continent that formed the vacant and wild area in a utopian state. (The list of these people, artists, intellectual groups, various institutions… is too long to be fully mentioned.) Gradually the situation changed: Internet space was filled with shops, newspapers, yellow pages, maps, or even sexual or political advertisements. It became everyone's daily routine. But the evolution of the new land was not easy to stop there.

THIRD PERIOD: WEB FOR EVERYONE

The WWW was not for the few and elected. Just like photography, characterized with the advertisement of Kodak "You press the button, we do the rest", every user-visitor could have their own environment in the WWW by effectively utilizing the new features of the communication digital space, as Manuel Castel states in [2]. It is something that the media industry did not achieve since it used the WWW only as "information highways".

FOURTH PERIOD: PERSONAL MASS MEDIA

In the last decade we observe a crucial transformation of space, the details of which are of particular interest. The first tools for communication and people networking (the first generation social media like mailing list, forum, and chat) are transformed into powerful personal-mass media (facebook, youtube, myspace, etc). This new kind of media overcome the dynamics of information, as well as personal views and audiovisual content exchange, and approach the dynamics of large-scale decision making. From mass-media they turn into mass-opinion-leaders (for example, the revolutions in Egypt, Tunisia, Libya, etc, as well as the "movement of indignant" in Spain, Greece and other countries.)

FIFTH PERIOD: FROM THE NETWORK TO DIGITAL GROUND

There is another significant level of change beyond WWW: A new type of user is formed, which adds an extra dimension to the new environment. According to Malcolm McCulloch, [3] a Digital Ground is created and we live on it. In this way, the changes, apart from the structure and functioning of the WWW internal, impact also on its body.

From the «home» computer and internet «cafes», in other words from an architectural space in which the user must be physically present in order to use his/her digital extensions, we pass on to an extension of the user's body, connected to the Digital Ground (smart phones, gps, iPads, etc).

In order to accomplish this description it would be interesting to mention some of the results.

FIRST RESULT: THE WORK OF ART IN THE AGE OF ITS "DIGITAL" REPRODUCIBILITY

We refer to the field of the traditional industry of art and entertainment, subject to devastating consequences:

The public manages for its own self what it wants to hear and see, disseminate or collect: The "see and hear" becomes "download and upload". In other words, we observe a new industry of spectacles, which is shaped by its own base (the public) and is at its infancy: Musical vanguard influenced by technology, after the playback of 60s, the synthesizers of 70s, and the samplers of 80s, now with myspace and youtube, shifts from the creation to promotion, presentation and sharing of artworks. The aforementioned procedure does not stop to the collection of artworks from the internet, but to a special production: hybrid machines telephone-cameras, and cheap or hacked software programs of sound and image editing contribute to the development of a digital folk art. Young people, amateurs, pensioners, but also artists use the network for promoting their work. [4]

SECOND RESULT: THE WORLD OF DIGITAL GAMES

The field of digital games is a field under rapid development and affects the areas of entertainment, art, artistic education and further on the overall status of the artist.

Digital games industry is already ahead of film and music entertainment industry. Thus two important new situations emerge that will significantly affect, apart from many other things, the evolution of art itself: the first is a new generation of artists of media industry type (a creative team of writers, designers, artists - technicians, musicians, etc. that are all working on a project) with all its implications (development of schools, festivals, theoretical analysis, etc.). The second is the development of extremely powerful tools of low cost that literally reverse the technological structure of research and production (i.e. the kinect sensor of Xbox).

Social Web as Art and vs. Art

It has already been mentioned that artists from every field of art followed, experimented, and used the constantly evolving digital environment (WWW).

At the same time web users (amateurs, young people or students), succeeded in changing important parts of industrial art (music and audiovisual expression), concerning the distribution of artworks and the promotion of new talents.

But do the artists feel the need to redefine once again their status by exploring virgin areas that are situated on the edge of the Internet and social media?, or will they follow (as most people do) the demands of social web?

Hasn't the artist yet managed, as Velázquez in Las Menina, to capture the "fourth wall" and himself/herself in front of it and outside of his artwork?

The answers can't be impressive because the construction of the "fourth wall" at the new space, in other words the creation of an extra surface which may - at the same time - produce the image of the creator, open a dialogue for self-awareness, and present the artwork itself, has not been created yet. The creation of such an infrastructure is neither easy nor impressive.

However, has this WWW utilization produced something new for artistic expression or is it just supporting old existing forms? Are the artists pioneers inside this space or are they just following the needs of the market that push technological developments? What is the difference between the "digital" folk art developed by the public with very cheap equipment (e.g. a mobile phone with camera) and the professional artist? Is it sufficient to present experience as art in the intangible world? Is the Web a "side" space, that only assists artistic expression in the real space, or is it an autonomous space of artistic innovation?

Has the opportunity of the internet to be a common utopian homeland for artists - researchers been lost? Is it possible that the physical and national boundaries of the homeland of every artist or cultural center do not confine the freedom of the artist? Does the artist himself request for that freedom? There are only a few individual cases of artists who reacted in an activist way beyond boundaries.

The artist, his/her laboratory, or the artist's work is hosted by virtual spaces. But more often the same process is repeated.

The Next Step: Is It the Creation of Art, or Is It the Creation of a Special Space for the Artistic Creation?

The role of the WWW should not be restricted only in communication and information archiving, but it should also include information processing. To serve that purpose work of the artist on the WWW should not begin from the artwork itself, but from the environment and the structures that will host the artwork; it could be the contemporary laboratory of the digital artist. [5] In this way, the artist moves one step forward from the existing tools, creating the new tools for the new creation.

References and Notes:

1. Peter Sloterdijk, *Bulles: Sphères I* (Paris: Fayard/Pluriel, 2003).
2. Manuel Castells, *The Internet Galaxy* (Oxford: Oxford University Press, 2003).
3. Malcolm McCulloch, *Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing* (Cambrşdge, MA: The MIT Press, 2004).
4. Manthos Santorineos, *De la Civilisation du Papier a la Civilisation du Numerique* (Paris: L' Harmatan, 2007).
5. Manthos Santorineos and Stavroula Zoi, "A Proposal for a Digital Art Laboratory that Meets Contemporary Educational and Experimentation Needs" (paper presented at the 5th Annual Edition of International Technology, Education and Development Conference, Valencia, March 7-9, 2011).

COSMOPOLITANISM AND NARRATION: THE DIGITAL TALE

Viola Sarnelli

I will focus on a group of Arab female bloggers, questioning the notions of 'exile' and 'cosmopolitanism'. Bilingual, bi-cultural interpreters of their societies, these women are offereing their views on the ongoing Arab revolts to people living away. Thanks to a media environment easy to access and to personalize, they can become active members of a 'community of equals', gaining the space of expression they often lack in their societies.

I. Exile and cosmopolitanism

In *Reflections on Exile*, Edward Said makes a distinction between 'cosmopolitanism' and 'exile', between the "incurable loss of the exile" and cosmopolitan "romanticism" (1984: 175): "Paris may be a capital famous for cosmopolitan exiles, but it is also a city where unknown men and women have spent years of miserable loneliness: [...] the hopelessy large numbers, the compounded misery of 'undocumented' people suddenly lost, without a tellable history"(ibid: 176). At the same time, this distinction can be put in perspective when considering exile in its more private dimension. Speaking of the opposite and interconnected phenomena of exile and nationalism, Said claims that "… both terms include everything from the most collective of collective sentiments to the most private of private emotions, there is hardly language adequate for both. But there is certainly nothing about nationalism's public and all-inclusive ambitions that touches the core of the exile's predicament. Because exile, unlike nationalism, is fundamentally a discontinuous state of being"(ibid: 177).

Probably, one of the most interesting aspects of Said's perspective on exile is the emphasis on the possibilities provided by this "discontinuous state of being". Even if loss is never underestimated by Said, at the same time he recognizes in exile a possibility for strengthening individual skills, with an emphasis on mobility and the use of technologies of expression that allow both the individual and the community to share and transform memories: "Exile is not, after all, a matter of choice: you are born into it, or it happens to you. But, provided that the exile refuses to sit on the sidelines nursing a wound, there are things to be learned: he or she must cultivate a scrupulous (not indulgent or sulky) subjectivity" (ibid: 184). The subjectivity Said speaks about, is especially conscious of the fact that "Most people are principally aware of one culture, one setting, one home; exiles are aware of at least two, and this plurality of vision gives rise to an awareness of simultaneous dimensions" (ibid:186). This description seem to apply well to the life conditions of some female bloggers, who are constantly translating their personal/collective stories for an audience which is different in culture and language.

In *Strangers to Oneself,* Julia Kristeva argues that "Those who have never lost the slightest root seem to you unable to understand any word liable to temper their point of view […]. The ear is receptive to conflicts only if the body loses its footing" (1994: 17). What Kristeva describes seems to be close to the idea of solidarity, connecting different cosmopolitan communities, depicted by Jacques Derrida in On Cosmopolitanism and Forgiveness (2003). The communities that Derrida portrays are 'cities of refuge' that offer asylum to exiled writers; this idea is not so far from that of the cyber cosmopolitan communities offering visibility to men and women who are oppressed in their real societies:

"That, in effect, very much resembles a new cosmo-politics. We have undertaken to bring about the proclamation and institution of numerous and, above all, autonomous 'cities of refuge', each as independent from the other and from the state as possible, but, nevertheless, allied to each other according to forms of solidarity yet to be invented. "(Derrida 2003: 4).

Both the 'cities of refuge' and the 'cyber citizens' can be considered as examples of different "imagined communities" - as Benedict Anderson defined the groups of people connected by "invented" forms of solidarity, that were at the basis of the birth of nation-states. These connections can rely on different kinds of media, used independently or simultaneously. Following the works of theorists such as Arjun Appadurai (1996) and Manuel Castells (1996), we can re-consider the condition of exile as a phenomenon that follows the planetary fluxes of images and information produced through the satellite and the web communication systems. On the one hand, we can consider the use of communicative platforms by immigrants and exiled people, that allows the mediated rebuilding of diasporic communities (Aksoy & Robins, 2006); on the other hand, some of these "imagined communities" develop new forms of social grouping and new identities (Giddens 1991), based on unconventional forms of social inclusion and exclusion.

II. Women and blogs in the MENA region

The use of blogs and social networks acquired a particular relevance in the countries undergoing political and social crisis, as for some of the Arab states. Recently, despite the persisting high levels of illiteracy and the difficult social and political position for female citizens in most of the Middle-Eastern/North African region, women seem to have played a central role both in participating to the protests in the streets and in narrating these events. Particularly through their personal blogs, they seem to have gained and managed a "technical and cultural control over external representations" (Brock, Kvasny & Hales, 2010) - representations that, in the specific cases of the region, are constructed by Western mainstream media.

Blogs have been interpreted as privileged spaces for the convergence of the private and the public sphere, "the means by which the 'feminine' voices, previously excluded from public discourse and kept hidden in the 'private' sphere, can now be released" in a public/politic environment (Kambouri & Hatzopoulos, 2007). Similarly, Fatema Mernissi (2005) describes the effects of the digitalization process in the MENA region:

"The key problem giving anxiety to elites and masses, to heads of states and street-vendors, to men and women in the Arab world today is the digital chaos induced by Information Technologies such as the internet and the satellite which has destroyed the *hudud*, the space frontier which divided the universe into a sheltered private arena where women and children were supposed to be protected, and a public one where adult males exercised their presumed problem-solving authority".

III. Blogs and narrations of war

During the past years, an increasingly high number of citizens have taken part in the collective narration of events of social/political relevance through blogs. In the case of the Iraq war, two of the most popular sources were the blogs of Salam Pax and Riverbend, a male and a female Iraqi citizen reporting, in English, the everyday implications of the U.S. invasion. Seven years later, the political revolts spreading from one country to another in the Arab region seem to acknowledge an even bigger role to the blogosphere and social networks, actively used by a huge number of citizens of different ages, gender and social conditions to promote revolutionary contents and to consolidate virtual communities, overcoming their oppressing regimes' control.

In this sense, blogs can be considered as pieces of postcolonial re-writings, that question the cultural and geographical centres, and especially the vertical structure of traditional media, making the hidden archives, that are part of our everyday life, visible.

Being spaces of questioning, these blogs often represent an alterity that cannot usually find place in the outside world; bloggers are often themselves a mixture of cultures and identities, acting as cultural mediators and interpreters – otherwise, as Salam Pax writes in one of his posts, "'Western' readers wouldn't get it, because it would be so out of their cultural sphere" (2003). They try to render the sufferance and anger, the horrible conditions of life of the populations they belong to, comprehensible; to make them emotionally and rationally understandable to people who belong to other cultures, through their mastering of the English language and their cosmopolitan education. Their position is often accompanied by a feeling of being a stranger and a betrayer in both cultures, experiencing the same tension of the 'exiled' person. Later in the same post, Salam Pax confesses:

"I feel like the embodiment of cultural betrayal. The total sell-out – and this is making me contradict myself all the time. [...] This is not the dialogue of equals we used to talk about. I keep making references to their – everything – because I am so swallowed up by it". [December 21, 2002].

Particularly in the case of the Arab female blogs, these digital diaries become the spaces where it is possible to negotiate the author's identity both inside and outside the political and social contexts. This happens thanks to the exchange with the readers - people from all over the world, mainly from Western countries - who become the loyal followers of these chronicles, giving the authors a well-defined role within the cosmopolitan public sphere. In order to allow the readers to identify with the experience of their everyday lives, each blogger choses a different strategy. Riverbend's blog, born in Iraq in 2003, is one of the best examples of a "domestic perspective" on the outside war. Here is one of her chronicles of the post-war period, implicitly underlining the fact that the Iraqi population consists of "normal" people living an absurd and nonsensical situation. provoking a kind of "It could be you" effect.:

"My mother stood anxiously by the open kitchen door, looking out at my father who was standing at the gate. E. and I ran outside to join him and watch the scene unfolding only 3 houses away. [...] I'll never forget that scene. She stood, 22 years old, shivering in the warm, black night. The sleeveless nightgown that hung just below her knees exposed trembling limbs- you got the sense that the troops were holding her by the arms because if they let go for just a moment, she would fall senseless to the ground. [...] It was the first time I had seen her hair… under normal circumstances, she wore a hijab. That moment I wanted to cry… to scream… to throw something at the chaos down the street. I could feel Reem's humiliation as she stood there, head hanging with shame - exposed to the world, in the middle of the night". [September 19, 2003]

For Riverbend, claiming that Iraqi civilians are "common, normal people" also means to defend the conditions that Iraq women apparently used to enjoy before the United States' invasion:

"I am female and Muslim. Before the occupation, I more or less dressed the way I wanted to. I lived in jeans and cotton pants and comfortable shirts. Now, I don't dare leave the house in pants. A long skirt and loose shirt (preferably with long sleeves) has become necessary. A girl wearing jeans risks being attacked, abducted or insulted by fundamentalists who have been… liberated!" [August 23, 2003]

IV. The 2011 Arab revolts seen through female blogs

In the case of female blogs that narrate the revolts in Egypt and Tunisia between January and March 2011, there seems to be a constant attempt to keep national and female issues together, sometimes with uncertain results. On her blog (justurhead.blogspot.com), the Egyptian Eman Hashim writes:

"I chose to look for the bigger picture, just neglecting women role in the constitution reforming committee, which included only men, as to put aside any battles that will distract us from the main bigger goal… The Revolution. But I think now is the time to say it loud: stating a constitutional amendment that will prevent women from the possibility of running for presidential elections is not and will not be accepted". [March 8, 2011]

In other occasions, the revolt seems to be an extraordinary occasion for allowing women to take part into the public life of their country for the first time. Bloggers can be found giving a patriotic nuance to the posts, as with Afrah Nasser, a young Yemenite journalist (afrahnasser.blogspot.com), now exiled in Sweden, who writes:

"Minutes ago, I was at a Men's rally where hundreds of thousands of Yemenis marched through Sana'a's streets. I marched with them. Keep in mind that Yemeni women never march with men for social, cultural and/or religious reasons, but I did it! It was an amazing feeling.. I had nothing but looks of respect and care from the men demonstrators. Long live my beloved people and my country!". [April 13, 2011]

These digital diaries are always made of different media, a personal bricolage of various means of expression - short movies, cartoons, literary pages - that contribute to the construction of another world, and the re-invention of the limited freedom of action that affects their lives. As Amira Al Hussaini summarizes on her blog homepage, provocatively called *Silly Bahraini Girl* (http://sillybahrainigirl.blogspot.com/):

"Silly Bahraini Girl is a blog for all of us - women blessed with a brain which ticks and a heart that throbs. A Bahraini girl is never silly but there are some factions out there who insist that we are not given our place in the society".

Even if most of these women denounce big limitations in female rights in their countries, they are well aware of their universal rights as cosmopolitan citizens. At the same time, their blogs are the platforms where to re-discuss the international representations of Arab societies. As Eman Al Nafjan explains in the "About" section of her blog, "There are so many non Arabs and non Saudis out there giving 'expert'

opinions on life and culture here, hence my blog. Get it straight from the source: Saudi, genetically wahabi and a woman" (http://saudiwoman.wordpress.com). Eman's objective, among many others, is to reach her reader directly, in order to negotiate those individual and collective representations she considers to be inaccurate. Her readers seem to be thankful for this approach, as demonstrated by many comments on her blog:

"It's intriguing to see what life is like in other parts of the world that are so different from mine. In America we have such pre-conceived ideas about other nations and their people that we get from our media. Most people believe it as truth and never take it upon themselves to discover the truth for themselves. Yes, there are differences. But not all differences are bad. We are all people. We all laugh, cry, hope, dream, breathe, love, die. We just do it differently" . [*loisanne67*, February 24, 2010]

In the central days of the revolts, the blog's task was to spread the 'revolutionary' view of the political situation, and to overcome the barriers of language. As it emerges in this exchange of opinions on the blog of the Yemenite Afrah Nasser, when answering one of her readers:

Nadia said...
The world is indeed thirsty to hear from Arab youth because most information available is in Arabic. For example, without blogs like yours how else would they know what's going on in Yemen?

Afrah Nasser said...
Nadia, my dear sis, I agree with what you mentioned. We have to tell our countries' stories in all languages so harmony could exist! [May 19, 2011]

Such a truly, even if simplified, cosmopolitan view of the world politics gives a pivotal role to new media. This role is also of direct witnessing for the ones who are unable to participate to the events. We can see it in the comments to a post of *A Tunisian Girl*, the blog by the political activist Lina Ben Mhenni (atunisiangirl.blogspot.com):

"I'm another Tunisian citizen of the world livin in France. We are so proud of you here and in so many other places... we just have to look at Egypt! But we're also so scared for you too, and so frustrated not to be there with you all right now, in Tunisia! […]You have already proved that we can fight for freedom! And gain it! […] And your precious posts are here to tell! You, our eye-witness, and even ear-witness! I know. You among others. You, a Tunisian girl, among others. You are not alone! [*Anonyme*, January 29, 2011]

There is a final element that unifies the narration of these women, a kind of temporal displacement, the fact they often offer a view of the present from the perspective of the past. The Syrian blogger Mariyah (mariyahsblog.com) on February 2, 2011, comments on the revolts in Egypt with a long quotation from Khalil Gibran, and publishes episodes of a novel based on her parents' story. The Egyptian Zeinobia (egyptianchronicles.blogspot.com) describes herself in the "About" section of her blog with these words: "I am just an Egyptian girl who lives in the present with the glories of the past and hopes in a better future for herself and for her country". The need to connect the present with the past, and the will to regain possession of this past in the contemporary Arab societies, has been stressed by Fatema Mernissi (2005) when she speaks of the state rulers' despotic attitude to the access to museums and to other art institutions. "It is this despotic appropriation of the past and all innovative domains from arts to domestic crafts by the rulers which explains why the issue of museums and time navigation are such sensitive

topics in the Arab media today" (Mernissi 2005, personal website). In the same online article, you can find her intense warning:

"The challenge for the intellectuals is to help rulers to equip the youth to surf responsibly on the internet by inventing futuristic solutions which equip them to navigate not in space only but also in time. Mastering time is the secret of graceful navigation in a globalized planet where meeting strangers daily is the only way to make a living. To travel in the past, that is to navigate in time, is the best way to teach oneself tolerance, and respect for diversity".

References and Notes:

B. Anderson, Imagined communities (London/New York: Verso, 2006)

A. Appadurai, Modernity at large (Minneapolis: University of Minnesota Press, 1996)

A. Brock, L. Kvasny and K. Hales, "Cultural appropriations of technical capital", Information, Communication & Society, no. 13 (2010)

M. Castells, The Rise of the Network Society, The Information Age: Economy, Society and Culture (Oxford: Blackwell, 1996)

J. Derrida, On cosmopolitanism and Forgiveness (London: Routledge, 2003)

A. Giddens, Modernity and Self-Identity. Self and Society in the Late Modern Age (Cambridge: Polity, 1991)

N. Kambouri and P. Hatzopoulos, "The banality of blogging or how does the web affect the public-private dichotomy", Re-public.gr, (consulted, July 15, 2011)

J. Kristeva and L. S. Roudiez, Strangers to ourselves (New York: Columbia University Press, 1994)

F. Mernissi, "Digital Scheherazade. The Rise of Women as Key Players in the Arab Gulf Communication Strategies", mernissi.net, (consulted July 20, 2011)

S. Pax, The Baghdad Blog (London: Atlantic Books, 2003)

Riverbend, Baghdad Burning: Girl Blog from Iraq (London - New York: Marion Boyars, 2005)

K. Robins and A. Aksoy, "Thinking experiences. Transnational media and migrants' minds", in Media and Cultural Theory, eds. J. Curran and D. Morley (London - New York: Routledge 2006)

E. W. Said, Reflections on Exile and Other Literary and Cultural Essays, (London: Granta Books, 1984)

FUTURE MASTER CRAFTSMANSHIP: WHERE WE WANT ELECTRONIC TEXTILE CRAFTS TO GO

Mika Satomi & Hannah Perner-Wilson

Craft, both as process and resulting artifact, implies notions of care, foresight, human skill and investment. In this paper we examine the practice of creating E-Textiles as a contemporary craft, and we ask ourselves what will become of this craft when the first fully automated machine for E-Textiles production hits the market. Will the craft in E-Textiles survive, and why do we care that it does?
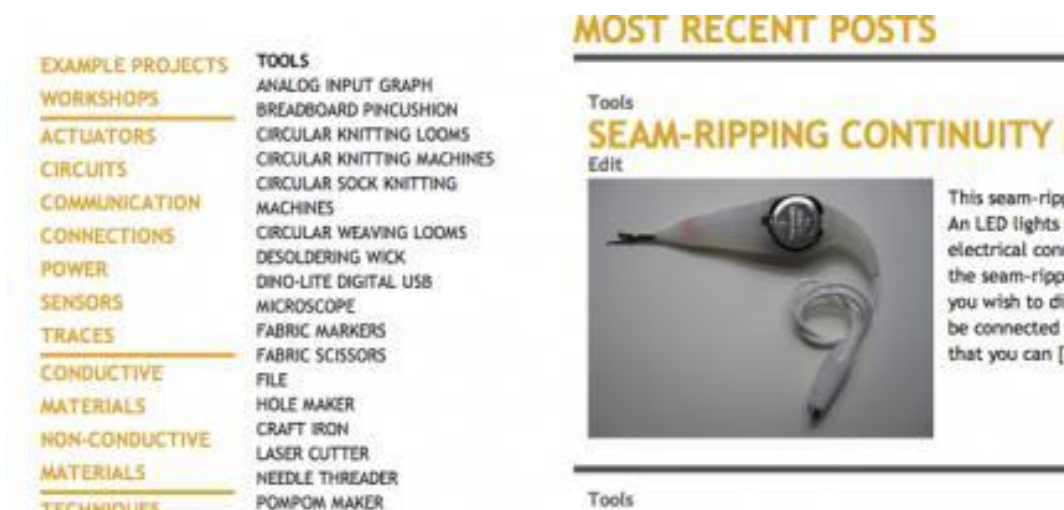
Figure 1: screenshot from 'How To Get What You Want' (www.howtogetwhatyouwant.at) online database.

Figure 2: workshop participants discussing over their textile circuit design. (photo: Mika Satomi).

Figure 3: Summer Camp participants collaborating on their embroidery circuit project. (photo: Hannah Perner-Wilson).

INTRODUCTION

Researchers, engineers, educators, artists and designers combine electronics and textiles for different reasons, to produce seamlessly integrated artifacts known as E-Textiles. While E-Textiles are produced for different reasons, the individuals involved in the process of making them, all benefit from exercising E-Textiles as a craft.

Researchers and engineers are looking to make electronics smaller, more flexible, stretchable and washable. Finding reliable and durable ways of creating electronic textiles is one of the most immediate research goals in their field. [1] Educators are introducing E-Textiles into the classroom as a means of situating electronics and computation in new, attractive and more accessible contexts. [2] Designers are conceiving garments, accessories and furniture upholstery that incorporate sensors, actuators and computational power into soft, comfortable, wearable experiences in order to demonstrate the possibilities of future textile technologies. [3] Artists are producing work that combines electronics and textiles as an expressive medium, often using E-Textiles as a vehicle for other content. [4] [5] [6]

While their motivations and goals my be different, craftsmanship is exercised throughout all of these disciplines. The researcher, the engineer, the educator, the artist and the designer are all capable of creating work in their field with attention to the craft quality of their work. As we continue to talk about E-Textile craftsmanship, we are not referring to a specific discipline or application, instead we refer to the skilled craft of individuals experienced in the use of the materials and tools involved.

THE CRAFT IN E-TEXTILES

We consider E-Textiles to be a contemporary craft, not only because it combines novel materials, tools and techniques with those traditionally associated with crafts. The process of creating functional, reli-

able and aesthetically pleasing E-Textile results, also relies heavily on the manual skill and technical expertise of the maker. It is a risky process, full of opportunity for innovative solutions and new inventions. It fits David Pye's description of workmanship of risk [7] - one of the defining notions of what constitutes craftsmanship.

"(I shall say as a first approximation that) it (craftsmanship) means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgement, dexterity and care which the maker exercises as he works." [7]

In David Pye's terms, we can think of craftsmanship as a process of making, in which the quality of the result is continually at risk. When we use the term craft, it does not exclude the use of hand operated machines. Craft does not mean made by hand, without tools or technology. It means made with care, with foresight, with skill and involvement. Drawing with Computer Aided Design (CAD) systems or programing computers can be also considered craft, as long as they involves human skill and judgement in their process. The balance between the difficulty of the required task and the skill one possesses determines the size of a risk. The bigger the risk you take, the bigger the accomplishment and the greater the feeling of reward.

"Craftsmanship names enduring, basic human impulse, the desire to do a job well for its own sake." [8]

By calling E-Textiles a contemporary craft we don't want to take anything away from existing and traditional definitions, rather we want to add a contemporary notion of craft as an interdisciplinary practice, producing cutting edge artifacts, use of novel materials and high-end technologies. The results of this contemporary craft process are unique and novel artifacts, they are inventions, innovations, artworks and personal accomplishments. While some of these artifacts remain strictly decorative, others fulfill specific purposes. Craftsmanship itself is not an indicator of good research, engineering, education, design or art, it can be applied and appreciated for its own sake. As automated production processes become capable of doing what we currently craft, the question presents itself: what will happen to the craftsmanship in E-Textiles?

WHO ARE WE, AND WHY DO WE CARE

Now that we have established E-Textiles as a contemporary craft, we want to introduce ourselves as E-Textiles craftspeople. We are individuals from different disciplines who have a stake in the craftsmanship associated with E-Textiles.

Currently, production of textile circuitry relies heavily on skilled work, mostly executed by hand and semi-automated machines, simply because automated manufacturing methods for combining textiles and electronics do not yet exist. As the field develops and demand for mass-produced soft, textile and wearable technologies increases, it will not be long before the processes that currently involve human skill, can be replicated by automated machines.

If the industrial revolution defined craft from industry, [9] maybe we are now in a position to launch the "craft revolution," in which we seize the opportunity to situate our practice as contemporary and progressive, adjectives not normally associated with craft. Progress is a big word, that often seems to stand between industrial production and craft, and is one of the first things that needs to change in this craft

revolution we envision. Progress does not imply quantity as much as it implies quality. Quality, individuality, uniqueness, are becoming important social values, as movements such as slow food, slow life and DIY practices demonstrate. [10] [11]

Production, formally known as craft, was swallowed by the industrial revolution, and craft became known as non-industrial production. But there is no real reason why craft has to exist as a counter movement to industry. It is not simply nostalgia for the rewarding feeling of a job well done, we also believe that our mode of production and work ethos offers benefits that industry can't, or doesn't care to.

The existence of automated machinery, that replicates craft processes, will not stop us from doing what we do, because we do it for different reasons. And yet, particularly at this point in time, it is a good question to ask: how would we like our practice to continue, once industrial automation kicks in? Will we become E-Texiles grandmothers, sewing LEDs onto t-shirts for our grandchildren while industry produces them in bulk? Will our grandchildren think of our creations as un-cool because they are crafted?

Our answer is that we would like to continue practicing our craft for many of the reasons people continue to practice it today, but to emphasize the potential for innovation and novelty, associated with a workmanship that is risky and geared towards quality. When our skills become devalued because machines can produce work faster, cheaper and "better", we will still enjoy the craft process. But instead of sitting back to become E-Textile grandmothers, perhaps competition from the automated machines will encourage us to move on. In accepting this challenge, as future master craftspeople, our aim is not to re-invent craft, but rather to re-invent ourselves as future master craftspeople. By talking openly and critically we hope to continuously find ways in which our practice can seek to express the advantages of man over machine.

In the remainder of this paper we discuss conventions, traditions and practices within the field of E-Textiles that support the kind of future craftsmanship we seek.

WHERE TO GO FROM HERE

In June 2011, The Swedish School of Textiles organized a week-long E-Textile summer camp with the theme of 'Future E-Textiles Master Craftsmanship.' [12] Eighteen practitioners from the field attended the camp, and actively participated in discussions, skill-shares and group projects. The camp was a platform for discussion about our current practice and about how we want to continue practicing our craft. We were concerned about finding ways of portraying and communicating our trade, that don't just focus on the common traits associated with craft, but also show a side to our practice that is interdisciplinary and tech-savvy.

From discussions that took place during the summer camp, and from our own experiences, we distilled a list of three core aspects, that we believe are key to supporting the kind of future craft practice we are aiming for:

1. Learning: acquire new skills, both knowledge (explicit) and know-how (tacit)
2. Community: engage with others, both online and offline
3. Exposure: share your results and study other people's skilled work

LEARNING

E-Textile practices involve both explicit and tacit knowledge. For example, circuit schematics or weaving patterns embody explicit knowledge, while learning how to solder and operate a weaving loom require tacit knowledge that comes from practice and experience.

When mastering one discipline, you need to learn both the explicit and tacit knowledge of the field. In E-Textiles practices, because of its interdisciplinary character, the practitioners are required to know multiple disciplines' both the explicit and the tacit knowledge. Often, one has to learn it outside of one's expertise. Currently many practitioners obtain this knowledge from books, online documentation or by attending educational courses and workshops.

E-Textiles itself is also producing its own knowledge, for example weaving Electro-Luminescent wire (EL-wire) into textiles, requires explicit knowledge of circuitry connections within woven structures, as well as tacit knowledge on how to choose the thread tensions when weaving the EL wire.

Example: How To Get What You Want

Since 2009 we have been documenting the materials, tools and techniques we use in our practice on our website titled 'How To Get What You Want.' [13] The site contains information regarding techniques for making sensors, actuators and a variety of circuitry, from conductive textiles. Most of these techniques are introduced with step by step tutorials that include a movie to best demonstrate the outcome of the application. The site follows the Open Source Hardware [14] definition, allowing people to freely use and modify our designs, as well as produce and publish new designs based on our work. Circuit schematics, source code and fabric patterns are made available for download in common file formats. The vendors of the materials used in our creations are also documented on our site, so that others can purchase the resources that they will need to replicate our designs.This database is not meant to be an encyclopedia of E-Textiles techniques, but rather a documentation of our trade, and one of the ways we pass on our knowledge.

COMMUNITY

Many practitioners in the field of E-textiles participate in the DIY community, by documenting their techniques online on various platforms such as Instructables [15] and Ravelry, [16] but also on their own blogs and websites. Some practitioners hold workshops or teach at educational institutes. These workshops and face-to-face meet-ups encourage collaborative learning and working models, fostering an attitude that thrives on sharing knowledge and skills openly. Physical meetings also foster discussions and healthy critiques of work, something which the anonymity of the Internet often lacks. DIY (Do-It-Yourself) or DIWO (Do-It-With-Others) communities serve as a platforms for exchanging both explicit and implicit tacit knowledge, motivating creative processes and encouraging collaborative work.

Example: Workshops

Since 2008 we have held over 20 workshops in many countries, hosting between 5 to 20 participants each time. The participants' background is various, from electronics beginner to experienced engineer to trained seamstress. During the workshops, we demonstrate or display our own technique on E-Textiles.

Participants are then asked to create their own projects using the introduced materials and techniques. Often these techniques are modified for their skills and applications creats new versions of it. These workshops provides a chance for participants to physically observe the processes and results that they can see in the online documentations. It is also an opportunity for them to get in touch with actual materials as well as with people with similar interests, serving as a place to start local communities among practitioners.

Example: Summer Camp

The E-Textiles Summer Camp gathered experts in the field to share and collaborate in intermediate-expert level. Participants were asked to share skills through hands-on workshops in which individuals shared E-Textiles techniques that they had developed and refined. The camp ended with a day of intense project work, in which participants split into groups based on their areas of expertise and interests (textiles, performance, craft...) to very rapidly brainstorm and realize a project that communicated some of the ideas discussed during the week. These discussions included questions of online vs. off-line documentation and community, open source issues, the level of expertise skills in collaborative works, finding ways to establish a community based on physical practice among distanced practitioners, ideas for new kinds of apprenticeships. Much was discussed and learned in this week and we hope to continue to organize similar opportunities for exchange in future.

EXPOSURE

Exposing ourselves to others work, by visiting exhibitions, fairs and conferences gives us a chance to study other people's skills and trades. Since E-Textile craft productions are most frequently shared and showcased online, there is very little opportunity for practitioners to study each other's work up-close and in real. Because of this, it is hard to establish a feeling for quality. By observing others work, as well as your own, we as craftspeople need to negotiate standards and nourish the skill to judge and distinguish 'good work'. The 'ability to judge' is crucial to developing critical standards for one's own practice.

Craftspeople in Medieval times traveled around during their apprenticeship called "journey man" to learn skills outside of their local community. Artist-in-residence programs allow practitioners to travel and collaborate with local communities. We could consider this as a modern apprenticeship model.

CONCLUSION

E-Textiles is a contemporary craft practiced across many disciplines. As E-Textiles craftspeople we envision that this craft will continue, even when automated machines are able to reproduce our work. We seek a "craft revolution", which associates craft with words such as progress, innovation and inventivenes. In this future society, we will create work that continues to be unique and rely on our individual skills, our human abilities to think independently and to care about and enjoy life.

To maintain the relevance of E-Textiles, passing on one's knowledge and trade, engaging with others, exchanging ideas and exposing yourself to the work of others is necessary. We need to keep our practice alive, but also insure that it grows to meet future challenges, that is why we talk about "future master craftspeople."

References and Notes:

1. *Stella Project's official Web Site, http://www.stella-project.de/ (accessed June 4, 2012).*
2. *Lilypond Web Site, http://lilypond.media.mit.edu/ (accessed June 4, 2012).*
3. *J. Berzowska and M. Bromley, "Soft Computation Through Conductive Textiles," Proceedings of the 9th International Foundation of Fashion Technology Institutes Conference, Toronto, (April 2007).*
4. *Ayah Bdeir's Web Site, http://ayahbdeir.com/ (accessed June 4, 2012).*
5. *Meg Grant's Web Site, http://www.meggrant.com/ (accessed June 4, 2012).*
6. *Ricardo O'Nascimento, "Popkalab," Popkalab's Web Site, http://www.popkalab.com/about.html (accessed June 4, 2012).*
7. *David Pye, The Nature and Art of Workmanship (East Petersburg, PA: Fox Chapel Publishing, 1995).*
8. *Richard Sennett, The Craftsman (New Haven, CT: Yale University Press, 2008).*
9. *Paul Greenhalgh, "History of Craft," in The Culture of Craft, ed. Peter Dormer (Manchester: Manchester University Press, 1997).*
10. *Slow Food Association's Web Site, http://www.slowfood.com/ (accessed June 4, 2012).*
11. *Maker Faire's official Web Site, http://makerfaire.com/ (accessed June 4, 2012).*
12. *Smart Textiles Summer Camp's Web Site, www.stdl.se/summercamp (accessed June 4, 2012).*
13. *Kobakant DIY Wearable Technology Documentation, "How To Get What You Want," http://www.kobakant.at/DIY/ (accessed June 4, 2012).*
14. *Definition of Free Cultural Works' Web Site, http://freedomdefined.org (accessed June 4, 2012).*
15. *Instructables' Web Site, http://www.instructables.com/ (accessed June 4, 2012).*
16. *Ravelry - A Knit and Crochet Community, https://www.ravelry.com (accessed June 4, 2012).*

THE MAGNETIC FIELD OF AUDIOVISUAL ART PRACTICES

Nermin Saybasili

The paper proposes the term *magnetic* - which I have coined - as an implement that invites us to re-think the artwork beyond its material presence and actual signification in digital culture. The discussion in the paper will be centred on the idea that audiovisual artwork can behave like a magnet by either pulling things and people towards itself as well as to each other or pushing them apart.

The digitally mediated world is a gigantic magnet that either pulls things and people towards each other or pushes them apart as an organising force within its magnetic field. In his book *Me++: The Cyborg Self and the Networked City*, William J. Mitchell points out that in the networked culture of the global world, neither our environments nor our bodies consist of single or contiguous enclosures. Rather they have become increasingly fragmented and dispersed. [1] If the world operates as a magnet for centralization, regulation and control, then the task for critics is to map or, even better, in a sense, to electrify other forces operating within dominant forces that generate social pressures. From this perspective, the paper proposes the term 'magnetic' –which I have coined– that is an implement inviting us to re-think audio-visual artwork as alternative electric currents and thus attract alternative forms of flows through mobility and/or social connectedness. Dealing with the element of voice and sound in installation works, I will argue that audiovisual artwork can behave like a magnet involving the mapping of the invisible, the temporal, the detachable, the connectible, the reversible, and the modifiable. By giving examples from certain pieces by visual and audio artists, I will focus on the magnetized and the magnetizable voice that awaits a place to attach to while acting and producing events by itself.

The Magnetic Voice

In the age of digital culture, artists develop a digital aesthetics that a certain shift happens from the eyes to the ears through the use of sound and voice opening up a new channel of sensation. Jacques Rancière puts sensation at the centre of artistic field. Rancière argues that what the artist does is to weave together a new sensory fabric by wresting percepts and affects from the perceptions and affections that make up the fabric of ordinary experience. This task is political. He speaks of the community of sensation which equating the 'individual' production of art with the sensory fabric of collective life. Sense here refers to both five senses and the sensual. Rancière defines this community an 'aesthetic community', a 'community of sense' that contains a certain combination of sense data: forms, words, spaces, rhythms and so on. [2] In relation to the use of voice in installations, I call this certain combination 'the magnetic.'

In our times, art is mostly produced and distributed digitally, and magnetism is inherent in digital culture. The artists do not only use digital technologies as a tool for the creation of traditional art objects, such as photograph, print, music, film and so on, but they employ these technologies as its very own medium, being produced, stored, and presented exclusively in the digital format and making use of its interactive features. As being the force of attraction or repulsion that acts at a distance, magnetism is due to a magnetic field which is caused by moving electrically charged particles such as a magnet. Inspired by this operational mode of digital technologies, I aim to interrogate audiovisual art practices that exhibits strong magnetic field. Through the act of listening as well as looking, an audio-visual artwork

can take shape or function as being inclined toward affect and not just towards perceived meaning, content, logos or truth. It can offer an aesthetic experience that facilitates a form of consciousness, an intensity of feeling, an energy for action. The digital voice can produce an aesthetic effect which stands apart from the referential or informational function of language. Voice is there for expression, as Mladen Dolar, a voice theorist points out:

expression versus meaning, expression beyond meaning, expression which is more than meaning, yet expression which functions only in tension with meaning, for it needs the signifier as the limit to transcend and to reveal its beyond. [3]

Hearing a voice and listening to it marks the moment of which it starts to operate as magnet therefore facilitating events and situations, introducing dis/connections, mobilizing bodies, and appealing to senses.

Speaking in visual terms, the recognition of forms is precise. However, sound and voice complicates the vision. Not being subordinated itself to the vision, voice becomes another object in the installation or another element in the video. Dolar points out a major difference between the visible and the audible:

The visible world presents relative stability, permanence, distinctiveness, and a location at a distance; the audible presents fluidity, passing, a certain inchoate, amorphous character, and a lack of distance. Voice is elusive, always changing, becoming, elapsing, with unclear contours, as opposed to the permanence, solidity, durability of the seen. [4]

Voice is on the site of event, not of fixity of things or the visibility of beings. It is magnetic. By its nature, voice knows neither interior nor exterior. It is a heavy task to keep the voice at distant. One is constantly exposed, no distance can be maintained to it.

In his book *Audio-Vision: Sound on Screen*, Michel Chion uses the term 'magnetization' in order to discuss the ways in which the filmic image 'magnetizes' sound in the space. By 'magnetization', Chion means mental spatialization, that is the psychological process (in monaural film viewing) of locating a sound's source in the space of the image, no matter what the real point of origin of the sound in the viewing space is. [5] He explains his point by giving some examples:

… if under particular screening conditions the loudspeaker is not located behind the screen, but placed somewhere else in the auditorium or in an outdoor setting (e.g., at the drive-in), or if the soundtrack resonates in our head by means of earphones (watching a movie on an airplane), these sounds will be perceived no less as coming from the screen, in spite of the evidence our own senses. [6]

Chion further argues that sound coming from another point than the screen is 'magnetizable' only if the sound itself maintains a basic spatial stability. If it constantly moves back and forth among loudspeakers, the image will have a harder time absorbing it, and the sound takes on a centrifugal force of its own that resists visual 'attraction.' [7]

A sound-installation can produce spatial magnetization on its own, free from the image or vision as formulated by Chion. The magnetic field is also a topography that is invisible, but responsible for the most notable property of a magnet. Ayse Erkmen's nine-channel sound installation *Ghost* (2010) which was exhibited in Thyssen-Bornemisza Art Contemporary in Vienna is a journey into magnetizing situations

and their electrified effects in a very particular way. The exhibition building was formerly known as the Palais Erdödy Fürstenberg and located in Vienna's first district where Ludwig van Beethoven spent a few months in 1806. Beethoven dedicated a number of works to Countess Anna Maria Erdödy, including the musical New Year's greeting *Glück, Glück zum neuen Jahr*(1819), whose ancestor owned the palace in 1714 and had it expanded in the following years. Besides a web of speculations about the relationship between Beethoven and the countess, Erkmen dealt with the rumor that the ghost of a young girl lives at the palace. Thus she re-composed the *Glück, Glück zum neuen Jahr* for a single voice, a soprano. In the sound installation, the singing voice of the soprano could be heard from nine speakers installed at the illuminated ceiling of the palace room. The singing voice coming from nine different speakers had a magnetic presence and a magnetized affect. This is partly because this had a bodiless voice, an 'acous-matic' voice, to put it in Michael Chion's words. There was nothing to look in the bright gallery room ex-cept the speakers and light bulbs, but certainly there was something to listen. Being neither inside nor outside the voice of the soprano distributed in all nine speakers behaves like separate magnets each wandering around the room seeking a place to settle. *Ghost* stretches the relationship of voice to a cer-tain place and bodies. Enveloping the empty gallery room, the singing voices urged the audiences to move across the space to engage with immaterial histories, intangible realities, hidden places, specula-tive facts, lost stories, and repressed presences. By reducing the many-voices cannon to a single soprano voice and diffusing the musical fragment in the nine-channel speaker system, Erkmen introduced an original dispersion to the gallery space. Sound environment magnetized its visitors, their bodies, their senses and their minds. The ear of the audience detected the depth from a sound blend producing a sonic perspective. *Ghost* therefore led its audiences to move through its stark yet dense soundscapes. As Sean Cubitt has written:

… sound … must be approached, walked into, penetrated, and, in walking into it, as your body subtly moulds the acoustic around it, the sound will penetrate you. …an open soundscape is a world in which others exist as well as yourself. [8]

In a sound environment, we cannot perceive like that of the visual field of perception. In *Ghost* the audi-ence inevitably oscillated between one visualized situation and the other sensed one, between what we can see and what we can listen and feel. An 'aesthetic community' emerges as the installation creates its own auditory public culture of the digital. *Ghost* has required the 'performative act' of listening as well as looking, it has created its own audiences who are urged to engage with a relationship of power and possession, to participate in lodging crucial knowledge, to transmit this, to manufacture public opinion, and to re-compose the cultural material obtained in private ownership for the general public in the age of digital culture.

Installation as an sonorous event that lasted leaves us with a crucial question: "Is it possible to retain the voice in the age of digitalization?" The technology of voice recording and reproduction surely makes possible to capture the voice. However the voice has never been just a pledge of presence, but rather an indicator of an impossible presence where the claim for authenticity or uniqueness becomes impossi-ble.

Sound Object

Once Gilles Deleuze has remarked upon the fact that "the machine is always social before it is technical. There is always a social machine which selects or assigns the technical elements used." [9] Following this thought, we can suggest that digital technology is a product of digital culture, not the other way around.

This means that our digital worlds encompass the ways of thinking and doing that are embodied within that technology. This involves how we interact to produce that culture. In this context, 'the magnetic' refers to a particular connection between art and politics in the age of digital culture. In our times, visual artists use digital technologies to insert themselves into the network of social divisions, hierarchies and obligations in order to produce a counter culture of digitality. Amongst many, one of the strategies is to develop the politics of voice.

In January 1985, the General Directorate of the Turkish State Radio and Television Corporation (TRT) banned the use of 205 words on TV and radio broadcasts on the grounds that they did not comply with the general structure of the Turkish language. As the only broadcast institution both television and radio programmes were under the monopoly of TRT. In collaboration with MC Fuat, hip hop singer and song-writer, Asli Cavusoglu made a song entitled *191/205* (2010) by using 191 banned words found in TRT archives and newspapers. In the installation work with the same title, Asli Cavusoglu invited audiences to play this record in a gallery context. Through the mode of appropriation, old associations have been replaced with new meanings. Singing voice does not act as law or speak in the language of the logos or the power, as written by Paul D. Miller, aka DJ Spooky that Subliminal Kid, "languages evolve and learn to speak in new forms, new thoughts.' [10]

TRT General Director Tunca Toskay explained the motives behind the order in an interview with Hürriyet Newspaper on 30 January 1985 in these words: "Our aim is to prevent lingual division" and "to take the language used in the constitution as reference." The real aim was to erase the words mostly attached to the leftist thought and politics in favor of the right-wing nationalistic world view. Toskay's words reflect upon the policy of shaping people's taste with a paternalist approach and the hidden agenda of making the citizens apolitical systematically carried out after the military coup of 1980. The order mostly banned modern Turkish words and replaced them with words of Arabic and Persian origin. [11] Repealed within few months, the censorship was directly linked to the processes of social engineering and State repression.

Pitting the voice against the master signifiers, indeed that of the names of the father, *191/205* engages us with remix and DJ culture. The narrative structure in the song lyrics and the singing voice magnetizes memories of the past in order to give a counter-response to the present social, cultural, political and economical situations in the country as well as in the world such as racism, civil wars, unemployment, etc. The voice in the song pinpoints a dichotomy of the voice and the signifier. Signifier is that in language which can be replicated and thus enables speech. It is in that language which can be linguistically classified, pinned down and dissected into a web of differences. But the voice cannot necessarily contribute to signification. The signifier can be stained by the voice who speaks, who uses the language. [12] According to Dolar voice is always a sound object, not merely the bearer of signification. This is where the effort of poetry lies. He writes:

The signifier has a double nature: apart from its differential, signifying, sense-making properties it also produces erratic sound echoes, reverberations, sound contagions, similarities, the stuff that can be put to use in repetitions, rhythms and rhymes, the stuff that can unexpectedly produce another meaning, inside of what makes sense, signification beyond signification, although both are inextricably tied together. [13]

As an installation in the form of a music set, *191/205* is destined to wait for its performer. As Nicolas Bourriaud points out "the contemporary work of art does not position itself as the termination point of the 'creative process' (a 'finished product' to be contemplated) but as a site of navigation, a portal, a

generator of activities." [14] Similarly, emerging as a social form through participation, *191/205* maps out a magnetic field of its own.

The Acts of Voice

The term 'magnetic' refers to a particular sort of potentiality that an audio-visual artwork can carry in itself. This potentiality refers to the co-existence of 'mobile elements' (objects, bodies, sounds, voices) that operate like magnets so as to produce a plural form and thus require another kind of material practice and spectator/listener.

Giorgio Agamben argues that in modern world societies have lost their gestures under the action of invisible powers. According to Agamben, art should belong to the realm of ethics and politics and not simply to that of aesthetics. [15] The philosopher inscribes gesture into the sphere of action clearly setting it apart from acting and making. "What characterizes gesture is that," writes Agamben, "in it nothing is being produced or acted, but rather something is being endured and supported." [16] Agamben therefore distinguishes gesture from representation that contains a sphere of means as addressing a goal and from a separate and superior sphere of gesture as a movement that has its end in itself. Instead Agamben points out that

 [t]he gesture is the exhibition of a mediality: it is the process of making a means visible as such. It allows the emergence of the being-in-a-medium of human beings and thus it opens the ethical dimension for them. [17]

Elements in an audio-visual artwork can arrange themselves in a gesture. I am interested in the use of voices in artworks that exhibits gesture and not image. Voice is not simply ephemeral. It can act, it can produce effects in the world and for the world.

Istanbul-Amsterdam Audio Tour, a sound art project, inscribes itself into the city of Istanbul as it was relayed to human beings in gestures. Utilizing the medium of audio guide or guided tour, *Istanbul-Amsterdam Audio Tour* made the voice record not just a signifier, but an act. The audience put on the headphones and listened to the voice narrating, giving information or instructions on certain sites or buildings in the city. An act of listening facilitates a sound walk which is magnetic. *Ticket to Amsterdam* (2010) for instance was a 50-minute sonic journey over the waters of the Bosphorus by the sound artist Justin Bennett and theatre maker Renate Zentschnig. The artists invited its audience to use the inner-city ferry during the tour to create an analogy between the Bosphorus of Istanbul and the IJ river of Amsterdam. According to the instructions given by the voice of the guide, The Turkish and Dutch Leyla Cimen, the audience started the journey by taking the ferry in Karakoy and ended up somehow in Amsterdam. Cimen made links, contrasts and similarities between the two cities, and the audience listened to her interviewing Amsterdammers and Istanbulites commuting from one side to the other on a daily basis. After landing again at Karakoy the audience as performer had the chance to be a sonic tourist as s/he wanders along the streets of Amsterdam even though her/his body was in Istanbul and s/he walks on the streets of Karakoy. *Ticket to Amsterdam* aims at facilitating experiences, experiences that different from the ordinary, from the imposed, from the habitual.

I read *Istanbul-Amsterdam Audio Tour* as an interrogation in the field of the 'magnetic city', a mapping of magnetizing situations and their electrified effects. The 'magnetic' of which I am speaking is about shifting from space to place and from permanent to temporal through mobile elements that operate like

magnets. A digital record came into existence as sonic as well as visual and tangible events through different elements and various scales relating to or produced by the magnetism. Sound moves the mass of the body and is moved forward with it. As written by Sean Cubitt, "sound enters space not to imitate sculpture or architecture, but, through electronic webs, to weave a geographic art." [18] The 'magnetic' city is not a space for architecture, but a place for people. It is an intensive soundscape and geography made of multiple spaces generated by voices and bodies. Consequently, it moves with the activities that define it. The voice comes from some invisible interior brings out more than one would intend. The audience had the power to decide over the fate of the voice, its effect. The listener as walker could rule over its meaning, or turn a deaf ear. The digital voice took place magnetically.

To conclude, the use of digital voice in contemporary artworks offers an understanding of looking and listening as central to the process of inventive and creative interpretation of and the participation of the world in the age of digitalization.

References and Notes:

1. *William J. Mitchell, Me++: The Cyborg Self and the Networked City (Cambridge, MA: The MIT Press, 2003), 16.*
2. *Jacques Rancière, The Emancipated Spectator, trans. Gregory Elliott (London-New York: Verso, 2009), 56-57.*
3. *Mladen Dolar, "His Master's Voice," in Amber'07: Art and Technology Festival, Voice and Survival (catalogue) (İstanbul: Body-Process Art Association, 2010), 110.*
4. *Ibid., 117.*
5. *Michel Chion, Audio-Vision: Sound on Screen, trans. Claudia Gorbman (New York: Columbia University Pres, 1994), 223.*
6. *Ibid., 70.*
7. *Ibid., 70-71.*
8. *Sean Cubitt, Digital Aesthetics (London: Sage Publications, 1998), 120-121.*
9. *Gilles Deleuze and Claire Parnet, Dialogues (London: Athlone Press, 1977).*
10. *Paul D. Miller aka DJ Spooky that Subliminal Kid, Rhythm Science (Cambridge, MA: Mediawork/The MIT Press, 2004), 25.*
11. *To give a few examples of the banned words: ulus meaning nation with millet; devinim meaning motion with hareket; devrim meaning revolution with inkilap; özgurluk meaning freedom with hurriyet.*
12. *Mladen Dolar, "What's in a Voice," in Amber'07: Art and Technology Festival, Voice and Survival (catalogue) (Istanbul: Body-Process Art Association, 2010), 94.*
13. *Ibid., 95.*
14. *Nicolas Bourriaud, Postproduction (New York: Lukas & Sternberg, 2002), 13.*
15. *Giorgio Agamben, Means Without End: Notes on Politics (Minneapolis, MS: University of Minneapolis Pres, 2000, 56.*
16. *Ibid., 57.*
17. *Ibid., 58.*
18. *Sean Cubitt, Digital Aesthetics (London: Sage Publications, 1998), 116.*

THE INTERACTIVE AND IMMERSIVE EXPERIENCES SHAPE THE NEW ARCHITECTURAL LANGUAGE

Teresita Scalco

This paper underlines how the hybrid relationships established among 3D and interactive installations offer sensorial explorations for a better understanding of architecture and the public space, by illustrating the works 'If building could talk…' by Wim Wenders and 'Sandbox' by Rafael Lozano-Hemmer.

Rafael Lozano Hemmer, Sandbox, Relational architecture 17, 2010. Glow Festival, santa Monica, USA. Photo by Antimodular Research.

"Freedom is participation." _Giorgio Gaber

In recent years, many artists, filmmakers and designers have studied the alliance between art, society and audience by employing new media and technology as innovative tools to rethink the use of public space and to reinvent new opportunities for experiencing and for a better understanding. Reflections on the idea of space and its collective awareness, that we have of it, can come from the contribution within the architectural research by exploring it with artistic and cinematographic languages and how they shape their narrative and the overcoming experience that we can live by walking through the artworks or installations that requires our active immersion with it. [1] This paper based on an ongoing research, started with the workshop in Exhibit Design, held at the Università Iuav di Venezia, aims to articulate how the embodiment of the interactive projections and 3D technologies enable artists, such as Rafael Lozano-Hemmer, to broadcast the environment we are living in a participatory way and film makers, such as Wim Wenders, to set new vision for architectural and landscapes scenes in exhibition space.

Often we forget that the exhibition space, such the Biennale, is more a laboratory, rather than a simple display, where interdisciplinary experiments can take place. In 2010 Kazumo Sejima, the Japanese director of the 12th International Architecture Exhibition 'People meet in architecture' of the Biennale in

Venice, invited Wim Wenders to interpreted her lyric building the Rolex Learning Center of the Ecole Polytechnique Fédérale in Lausanne (Switzerland) for the exhibition space at the Arsenale. For the German director the primary issue was to convey the strong feeling of the building, which perfectly resonates with the surrounding landscape, and secondly capture the openness and the sense of 'infinitum' of the center. So he found amusing the idea of experimenting 3D technology in an immersive installation, titled 'If building could talk…', in order to give the viewer the impression of being into the screen and to live the architectural experience of walking in it. [2] [3]

But in fact the building talks to us! Wenders guides us in a persuasive exploration of the space, into the architectural structures and the soul of the idea behind it. To use 3D technology appeared to be the most suitable way to translate the multiple curves of the building and the losing of orientation suggested by it, because curves generates (physical and intellectual) directions translated into a fluid shooting, where the fascinating survey on the relationship among space and time is narrated as a storytelling, whispered by Megan Gay's velvet voice: «Can you hear me? Places have voices. Buildings can talk, as you can hear. No, not all of them. But some need too. Some have chosen to remain silent. Some really want a constant dialogue with us ». In the silence, Thon Hanreich's music amplified the perception of the space, giving volume to it which can be only an interpretation of architecture within the exhibition space. Thus is the movement-image, where « objective and subjective images lose their distinction, but also their identification, in favour of a new circuit where they are wholly replaced or contaminate each other», as Deleuze stated, that extracted the essence of the place. [4] Without solution of continuity, the 12 minute film run in a continuous loop the same sequence of images, but with slight changes in the text and music, thus offering multiple sensorial perceptions to the spectator. For this reason Wenders has chosen to use digital technology as a tool for emphasizing, in order to make more effective the communication of the architectural experience based on interdisciplinary approach. Moreover this also met Sejima's curatorial aims to stimulate and create new thinking processes and new ways of understanding the world we are living in.

One of the reason why I have chosen Wim Wenders's installation at the Biennale was due to the fact that it was a 3D movie designed for an exhibition space, in other words a place of public cultural consumption, while on the other hand I would like to compare it with Rafael Lozano-Hemmer's installation-event 'Sandbox', in the Californian shore in Los Angeles, since in this case it takes place in an oudoor public sphere has a more political and social dimension.

'Sandbox' was a large-scale interactive installation created originally for Glow in 2010, which was an all night cultural experience that imagines the Santa Monica beach as a ludic agora for free access of a participatory and temporary artwork. The large-scale project consisted of two sandboxes: in one infrared surveillance cameras detected people walking on a certain 3,000-square foot stretch of so than it could be projected in the second sandbox and watch their actions magnified in large scale on the beach. « As participants reach out to touch these small ghosts, a camera detects their hands and relays them live to two of the world's brightest projectors, which hang from a boom lift and which project the hands over 8,000 square feet of beach. In this way people share three scales: the tiny sandbox images, the real human scale and the monstrous scale of special effects», describes the artist in his website. [5]

That is the reason why his work is as empowering as provocative.

A core element of the research by Rafael Lozano-Hemmer's thought is on designing spaces and dynamics for and of participation 'where a plurality of positions may emerge', in any case both examples integrate the observers/visitors with the digital image.

Furthermore, Lozano-Hemmer's work implies an invasion of the physical space, where the real body of the spectator turns into the moving image (simulacra) of the co-author of the performative interactive installation, since his research has always leaned, as said, to pursue a certain number of social issues.

More broadly he states that «technology is inevitable the language of globalisation […], it is inseparable from contemporary identity and it can be used as a way of criticizing from within some paradoxes of our culture.» [6]

For example it is interesting to put in practice that the technologies used for 'Relational architecture' installations mainly are the same ones used for the security system of control in order to identity and to punish, but by manipulating the use of them (such as the ominous infrared equipment or the video tracking system) with digital cinema projectors into amplified images, the sense of intimidation, fear and social disconnection is transformed instead into an intimate and a more playful relation with the public cultural arena, which in this case was the Santa Monica beach.

This leads to a final key question: does every one really want to participate in the cultural agora? Obviously no, but the interactivity experience in Lozano-Hemmer and the more contemplative immersion in viewing Wenders's movie are both examples of enriching opportunities to learn, generate new forms of attention and collaborative production of senses in our contemporary society.

In conclusion, what we can observe is that by participating in a collaborative manner with immersive experiences with the audience, both in an indoor exhibition space and outdoor public sphere, we can expand our own perceptions and widening our experiences; this ultimately leads to a broader understanding in life, a deeper awareness of freedom and hopefully to a re-design of our cultural landscape.

References and Notes:

1. *Gilles Deleuze, Millepiani no 28: Spazi Nomadi: Figure e Forme dell'Etica Contemporanea (Roma: DeriveApprodi, 2004).*
2. *Teresita Scalco, "Se l'Architettura Potesse Parlare…", Bollettino d'Ateneo's Web Site, October 2010, http://www.bda.unict.it/Pagina/It/Notizie_1/0/2010/10/04/4088_.aspx (accessed July 27, 2011).*
3. *Wim Wenders's official Web Site, http://www.wim-wenders.com/ (accessed July 27, 2011).*
4. *Gilles Deleuze, Cinema 1: The Movement-Image, trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis, MN: University of Minnesota Press, 1986), 149.*
5. *Rafael Lozano-Hemmer's official Web Site, http://www.lozano-hemmer.com/ (accessed August 15, 2011).*
6. *Heimo Ranzenbacher, "Metaphors of Participation," in Takeover – Who's Doing the Art of Tomorrow - ARS Electronica, eds. Gerfried Stocker and Christine Schopf, 240-243 (Vienna: Springer-Verlag, 2001).*

IS AUGMENTED REALITY THE ULTIMATE MUSEUM APP? SOME STRATEGIC CONSIDERATIONS

Margriet Schavemaker & Hein Wils

In the past year, the innovative forms of augmented reality (AR) appearing on smartphones have proven to be exciting playgrounds for curators and museum educators. These AR tools offer users the possibility to deploy their phones as pocket-sized screens through which surrounding spaces become the stage for endless extra layers of information. What does this innovation mean for museums and their daily practice?

In the past year, the innovative forms of augmented reality (AR) appearing on smartphones have proven to be exciting playgrounds for curators and museum educators. These AR tools offer users the possibility to deploy their phones as pocket-sized screens through which surrounding spaces become the stage for endless extra layers of information. This visual collision of the real and the virtual – made possible by using GPS and a compass – could culminate in what we have seen in movies like *Minority Report* (2002), where Tom Cruise physically navigates through 3D data: a seamless interface between the body, the virtual and the real. Currently, however, AR technology (Layar or Junaio, for instance) is still a kind of experimental medium, as yet lacking the total immersion that science fiction promises. Moreover, its mediation through a tiny handheld screen poses several challenges to augmented storytelling. What, then, does this contemporary form of AR have to offer the museum today? Why would a museum want to develop augmented reality tours? What kind of user experience does it entail? Is it, in this day and age, the ultimate app? These questions will be addressed here by taking a closer look at the experiences of the Stedelijk Museum's AR project, *ARtours*, which explores a number of augmented reality applications in order to experiment with these new platforms in different contexts and with different kinds of art.[i]

Lieux de mémoire, space hacking & artistic platform

Taking a closer look at the deployment of AR by museums, it seems that the attraction of this new medium is often found in the act of returning cultural heritage to the streets where it was originally produced and/or that it depicts. As the apps of the Powerhouse Museum[ii] and the London Museum[iii] effectively illustrate, AR allows users to see photographs on their smartphones of old city views overlaid on the places that they were shot. Comparing a 'real' contemporary with an 'augmented' older view offers a moment of reflection on history, modernization and change.

The Netherlands Architecture Institute (NAI) included even more time dimensions in its unequaled application (UAR)[iv], as visitors are not only treated to former architectural drawings of the locations where one is positioned, but also to unrealized designs and future projects. The strategy, however, remains the same: using AR as a medium to layer the urban realm with a museological collection in order to compare its current outlook with that of other times and ages. In a sense it is using AR as a form of what Pierre Nora would describe as *lieux de mémoire*.

For a modern and contemporary art museum like the Stedelijk Museum in Amsterdam, this strategy for AR deployment is relevant in that the word 'Stedelijk' means 'municipal' and parts of the collection are produced by or related to the Amsterdam cityscape. However, layering the streets and canals with these local artworks has certainly not been the main reason for investing so much energy in the development of *ARtours*. First and foremost, the museum is known for its extensive international collection of art, photography and design, which itself asks for a different curatorial approach and visitor experience. Secondly, the Stedelijk Museum has been closed since 2004 due to an intense renovation of its original building and construction of a new wing. AR was therefore primarily embraced because of the possibilities it offers for exhibiting the collection, as the museum has lacked an analog venue in which to do so. In other words, in addition to *lieux de mémoire,* the Stedelijk opted for *space hacking*, a strategy in which augmented reality is used to present the collection in spaces with which the art has no relation whatsoever, but are simply used as a new stage.

We experimented with this strategy in the *ARtours* project entitled "ARtotheque".[v] The idea is simple: the Stedelijk Museum holds thousands of artworks in its collection, so why not lend copies to the general public via the medium of augmented reality so that people can place the artworks wherever they choose? The project location can be anywhere; we experimented at Lowlands (a Dutch music and arts festival with 50,000 visitors) and at the innovators' festival, PICNIC. Participation was relatively simple: the visitor could choose an artwork from a selection of 160 masterpieces, all printed on A4 cards, scan the QR code on the card and thus activate the "ARtotheque" (art loan) layer on the Layar platform. The visitor could then choose a position for the artwork, hang it and share it with all other works in the public "ARtotheque" layer.

As the Stedelijk Museum is also known for its contemporary art projects, another utilization of AR appeared relevant: augmented reality as an *artistic platform*. In the *ARtours* project entitled "Me at the Museum Square" *ARtours* experimented with this strategy by asking students from various Dutch art schools to design an augmented reality artwork to be virtually manifested on the large square adjacent to the museum.[vi]Stedelijk curators made a selection of the most promising ideas and together with students from the University of Amsterdam and the School for Interactive Media (project Medialab), the 3D 'ARtworks' were realized. Besides helping the project to get a better grip on the possibilities of Layar and the practical problems AR applications pose to users (too much sunlight, battery consumption etc.), another result of this project was the fact that several of the created artworks reflected upon the new medium.[vii] For instance, in one work audience members could virtually augment themselves with auras in various colors, which derives from the artist's idea that AR is, similar to auras, visible for some and for others not. Another artist placed a springboard next to the small pond on the museum square. The title of the work, 'The most fun you will never have', addressed the fact that, in augmented reality, the virtual is colliding with the real but not transforming into the real (in a material sense). It is this kind of self-reflexivity that helps us in coming to terms with AR's cultural significance.

Let's go inside

In the summer of 2010 the Stedelijk Museum got the old part of its building back. The renovation was almost finished and, although the additional wing was not yet ready, the museum could make a start with temporary exhibitions and public programs. For the *ARtours* project, this signified an interesting strategy shift to bring AR out of the streets and into the white cube.

As early as 2002 media theorist Lev Manovich claimed that, with augmented space,

museums and galleries as a whole could use their own unique asset – a physical space – to encourage the development of distinct new spatial forms of art and new spatial forms of the moving image. In this way, they can take a lead in testing out one part of the augmented space future…

Having stepped outside the picture frame into the white cube walls, floor, and the whole space, artists and curators should feel at home taking yet another step: treating this space as layers of data. This does not mean that the physical space becomes irrelevant; on the contrary, as the practice of [Janet] Cardiff …shows, it is through the interaction of the physical space and the data that some of the most amazing art of our time is being created.[viii]

The *ARtours* project selected for its first indoor *AR(t) project* artist Jan Rothuizen, known for his hand-drawn maps on paper.[ix] In the AR application Rothuizen's drawings are virtually appended to the spaces of the building to which they refer. Using a smartphone you can open the tour and follow Rothuizen's childhood memories of the museum throughout the gallery spaces. Also included are his references to the Stedelijk's renowned history and close observations of the institution made while spending a night in the building.

The result is a layering of the real with virtual information, bringing the objective outer world of material spaces into collision with the subjective inner world of conceptual memories and storytelling: a mapping of the museum inside the museum that echoes the psychogeographical maps produced in the 1960s by the French Situationists.

Of course the move from outside AR to inside was not that easy, as current technology (Layar) relies on GPS to attach the virtual to the real. GPS has difficulty in distinguishing vertical levels inside a building, thus additional interfaces are needed to delineate one's location inside the building. Since these methods of interface have not been perfected yet, we are pleased that AR providers are exploring new solutions to the problems of bringing the technology indoors. The *ARtours* project will experiment with these in the near future in collaboration with Fluxus artist Willem de Ridder, who is working with us on one of his 'Secret Exhibitions' in AR. Moreover, we are exploring possibilities of bringing a selection of the Stedelijk museum's famous exhibitions back into the building by means of AR, re-using the museum archives and documentary material.

Innovation & collaboration

Besides all these more practical and media-related strategies that readily illustrate how and why a museum might use smartphone-based augmented reality, there are more overarching reasons as well, of which 'innovation of audience participation' seems the most pivotal one. For the Stedelijk Museum this seems to fit a long-established tradition: the museum is said to be the first in the world to have created 'audio tours', in 1952.[x] Of course the radio broadcast technology used in that time was far from perfect and the experience was almost identical to a conventional guided tour (for instance, people were bound by the tour's time constraints and were not free to move around, being required to follow a linear story). However, as specialist in the field Loïc Tallon rightly makes known, this was not the point. What mattered most was that the audio tours of 1952 were launched by the Stedelijk at the same time that the ICOM conference was held in Amsterdam that year. Consequently, the entire museum world took notice of this new development and many immediately started to develop similar systems. Therefore Tallon concludes that

Above all, I believe that it was the innovation and potential embodied within the audio guide that best explains why the Stedelijk Museum 'invented' it. Whilst one could claim that what was achieved by the system could have been achieved through trained docents, this is too narrow a perspective. After all, this innovation went on to spawn what was arguably the most successful museum technology of the 20th century, and one of the most exciting of the early 21st century.[xi]

In 2011, 'innovation and potential' also seems to be the driving force for augmented reality applications. It is not about offering the most perfect technological solution and radical new user experiences. More-over, it is often hard to define differences with respect to existing multimedia tours. However, the po-tential for bridging the gap between the virtual and the real world in a single visual interface is a dream shared by many and thus a great stimulus for future innovation.

Innovation can only exist through collaboration. In 1952 the Stedelijk Museum created its audio tours with the renowned Dutch enterprise Philips. At present the Stedelijk works with several technological and design partners, such as Fabrique, 7scenes/De Waag, Tabworldmedia and Layar. Collaborations with educational partners (University of Amsterdam, Hogeschool van Amsterdam, art schools) and cultural organizations (Tate, Virtual Platform, ISEA, kennisland) also exist. These partners should not only receive full credit for the *ARtours* project, but should also be thanked for the innumerable innovations inside the Stedelijk organization they have triggered thus far and will continue to do so in the future: from funda-mental changes in museum technology (ubiquitous Wi-Fi access) to new takes on copyright issues; from changes in media awareness and the programming of our educational and curatorial departments to new policies on the future of audio tours in the museum; and so on. For a museum reinventing itself in the 21st century this is invaluable, and leads to the idea that a museum should always incorporate at least one innovative project like *ARtours* every other year.

Paratouring

Can we already draw some conclusions about the outcome of the first 1.5 years of the *ARtours* project? Findings that may help other museums to decide whether augmented reality can be their ultimate app? Insights that may fuel debate on the future of mobile technology in the museum?

Inspired by the "un-conference" concept, museum professionals at the industry conference, Museums and the Web, and elsewhere have for the past couple of years discussed the "untour", referring to the manifold possibilities in our current 2.0/3.0 phase where mobile tours can go beyond the traditional audio tour format.[xii]

The *ARtours* project defines another interesting development in the usage of mobile media inside the museum: the 'paratour'. The term 'para' refers to the extra information that normally accompanies the core text of a publication: the introduction, conclusion, notes and additional literature, often provided by the editor, which are collectively referred to as 'paratext'. They are the discursive elements that frame the text, positioning it through an extra layer of information.

Of course the traditional audio tour can itself be considered a 'paratext', as it frames art with an auxil-iary text. However, the *ARtours* project indicates that innovative museum tours, like augmented reality applications, become especially significant by way of extra communication tools and additional layers of information. Significantly, the tours elicit communication among the users. In order to use an AR tour,

generally one has to join forces, as not everyone possesses the appropriate smartphone, the user inter-face is still challenging for some, data traffic is not equivalent for all telecom providers, using the app tends to drain batteries quickly, etc. This turns the AR tour into a social event, something the Stedelijk Museum facilitates by organizing a public program and opening event every time a new project is launched.[xiii] This form of 'paratouring' among users exists not only in the analog world, but extends into the virtual one as well via social networking services like Facebook and Twitter. In addition, the *AR-tours* project has opened the eyes of the museum to a ceaseless flow of professional 'paratouring' by museum and other mobile technology experts. The innovative mobile museum tour has an amazing, ex-tended lifespan mediated through videos, PowerPoint presentations, lectures, Twitter feeds, blogs, con-ferences, round table discussions, expert meetings, wikis and remarkable press coverage. It may even be the case that the *ARtours* project has more followers on Twitter and via our blog than people who have actually experienced the AR tours themselves.

Of course one can denounce 'paratouring' - or, in terms of AR, 'pARatouring' – as a distraction from what the tour is really about, namely, mediating knowledge and enhancing visitor experience both in-side and outside the museum. This is a risk, and we should take care that it does not obstruct the actual encounter with the museum, collection or exhibition. Still, we cherish the fact that a museum that has been in hiatus for over seven years is suddenly back in the spotlight![xiv] If this can happen in the world of mobile media, why not in other fields as well?

Concluding remarks

If we now return to the central question of this discussion - 'is augmented reality the ultimate museum app?' - we must conclude that, at first sight, it certainly is not: the technology is experimental, the user interface problematic and we are as yet very far from the ideal future of total immersion and seamless interfaces (as visualized in movies like *Minority Report*).

On the other hand, we have seen that AR can be significant for museums in many ways, both outside and inside the museum, as it:

- offers interesting collisions between virtual (digitized) heritage and real (analog) space;
- provides a new platform for artistic experimentation;
- is a perfect medium for museum innovation and collaboration; and,
- generates enormous amounts of communication, interpretation and contextualization (the so-called 'paratouring').

For the Stedelijk Museum, in its current 'temporary' phase within and without its building and in the process of reinventing its institutional identity, AR has proven to be the ultimate app! For other muse-ums the best recommendation may be to consider all relevant strategies… and then engage in it any-way.

References and Notes:

[1] http://vimeo.com/15191266

[1] 'Me at the Museumplein' see http://ikophetmuseumplein.nl/

[1] More details in http://conference.archimuse.com/mw2011/papers/augmented_reality_and_the_museum_experience

Take a look at http://vimeo.com/15191542

[1] Lev Manovich, The Poetics of Augmented Space, 2002 (revised 2004)

[1] http://vimeo.com/18092710

[1] http://www.openbeelden.nl/media/22823

[1] Loïc Tallon http://musematic.net/2009/05/19/about-that-1952-sedelijk-museum-audio-guide-and-a-certain-willem-sandburg/

[1] See Nancy Proctor's workshop on the topic of the 'Mobile Untour' at MW2011:http://conference.archimuse.com/mw2011/workshop/mobile_untours and notes from the "Un-tour Unconference" session, Museums and the Web 2010. http://conference.archimuse.com/forum/untour_unconference_session

[1] An event around gaming ('Play it!'…) in which the Stedelijk AR(t) project Jan Rothuizen was launched. http://www.stedelijk.nl/en/now-at-the-stedelijk/lectures/agenda-lectures-and-events/do-it-play-it

[1] Read the article Art Gets Unmasked in the Palm of Your Hand that appeared in the New York Times and in which the Stedelijk Museum is one of the major cases next to major museums like the MoMa http://www.nytimes.com/2010/12/02/arts/02iht-rartsmart.html?_r=2&emc=eta1

ERROR IN APPARATUS AS AESTHETIC VALUE

ALEJANDRO SCHIANCHI

An error seems to be that which gets between the ideal being and the real being; the error appears to be a singularity, a Non-being that transforms and distorts the Being. Audiovisual techniques, technologies, devices and media try to suppress errors; however, an ideological and aesthetic possibility hides behind the use of errors.

Untitled, 2006, Alejandro Schianchi, Video Object, Copyright Alejandro Schianchi.

Introduction

An error, a failure, or an accident connotes something that is bad, wrong and inappropriate. The purpose of this work is to demonstrate the positive aspect of errors that take place in the artistic production achieved with audiovisual machines.

We will start by giving a more precise meaning to what we usually call "error". In order to do so, we will resort to its scientific definition, particularly in the fields of physics and mathematics: "difference between the measured or calculated value and the real value". This means there is a difference between the real obtained result and the prevision we had made and had thought as certain. At this point we will introduce an element which is important to highlight: the concept of error would be unconceivable without the idea of prevision. Previewing entails supposing, waiting, and, above all, "believing" — in terms of faith — that something is going to occur and is going to happen somehow. Only in this way the error is able to appear. If, for example, we do not expect anything in particular from an apparatus that produces images, any result will be satisfying. Moreover, we can set forth that in the field of the arts originality, unlike repetition, carries a different value. Every time art moves away from the normative pressure of academicism (evident in the vanguards of the 20th century), it will attach a positive sense to the difference explained as a shortfall by exact sciences.

If we talk about prevision and repetition, the concept of definition inevitably comes up; definitions are later transformed into classifications. Stability allows us to sort the elements that make up a system according to their characteristics. When we use a photographic camera in the usual way, we expect to obtain, after a series of processes, an image that is true to the one that was in front of the lens of the camera at the moment of exposure. If we obtain instead a splotch, we will infer that some kind of error occurred during the process, because the photographic camera (in its standard definition) does not produce abstract images, but rather reproduces objectively that which is captured by the lens.

Perfect Machines

The utopian view of an error-free machine finds it's origin within two spheres, science and religion.

We mentioned already the pejorative definition of an "error" in mathematics and physics, where the goal is clearly to eliminate errors, and where we find the impetus for the "Difference Engine No. 1". Designed by Charles Babbage, the Difference Engine No. 1, without the need for human intervention in its calculation process, is considered a precursor to modern day computers. The data is entered, the gears turn, and we obtain a result free from the common errors which would occur when using the mathematics tables of the time. On the other end, with the utilization of the clock by monks in the the VII century to schedule time for prayer, religion (western Judeo-Christian) found itself concerned with embedding meaning into machines. And as David F. Noble explained, the Middle Ages began to see these technological devices as a means to re-establish the divine order which governed in the lost paradise. One of the first records which demonstrates this relationship is the "Utrecht Psalter" where we can observe two armed groups, one allied with God and the other with the Devil. In the latter, we observe the use of stones in sharpening their swords, while the "divine" group utilizes grinding machines.

Technological progress becomes a virtue, and a quest for perfection in science and religion. A possibility to eliminate "errors", that built also a general quest that conduct most of modern society until today.

With the passing of time devices became more complex, and the ideal machine became an automatic system free of errors. The user simply turns it on and waits for it to produce what is expected. The engineer, programmer, or technician needs to foresee all the possibilities the automatic system may face, in order to minimize the margin of error during it's operation. For most of the users, this automation

turned the machine into a black box. However, an unexpected action is found hidden within its automatic operation, which leads to imagining scenarios of rebellion where machines turn against their creators.

Error in Art

Different from science and religion, the artistic vanguards of the XX century established that the exceptions to the rules and systematizations, the uncertainties, chances and "errors" and all those elements outside the scope of Art's classical conventions, could be included and used as another element of aesthetic creation.

The productions and considerations of Luigi Russollo and John Cage in music, Marcel Duchamp, Nam June Paik, and Wolf Vostell among others, do nothing more than continuing the error inclusion proposal in the artistic field and confronting the common uses of the technical devices around us.

These subversions of technology created even a stronger impact on the current massified "digital" supports environment, where errors try to be eliminated under a system of more than 50 different correction methods, which were highly advertised with the arrival of the "digital" supports.

In the sounds and digital images world, the cases of Yasunao Tone, Oval, Takeshi Murata, and JODI, among others gave rise to an aesthetic called "glitch" which paradoxically proposes the repetition of a certain sound or image as resulting from accidents and "unexpected" actions from the digital audiovisual devices.

Expanded Glitch

Nevertheless, we do not believe that the analysis of errors should be restricted to audiovisual devices, we think that errors are essential to the functioning of any system, therefore, we could analyse how error works in philosophical, scientific, social and economic systems. And encourage to take errors in the aesthetic field as a possibility to discover new elements of a work of Art.

A failure in an apparatus program often sends back a faulty image or a sound which cannot be otherwise conceived. Limits are blurred, and we are faced with the naked truth, without attires or pretenses. We receive data, waves, and exposed information according to an artificial mechanism which constantly defines itself in its errors.

This is what makes an error unique, revolutionary and beautiful, and there lies its value.

A short circuit in an appliance builds a new and unpredictable world that is embraced by the artistic field as one more aesthetic element.

References and Notes:

1. *Alain Badiou, Being and event, trans. Oliver Feltham (London: Continuum, 2005).*
2. *Kim Cascone, "The Aesthetics of Failure: Post-Digital. Tendencies in Contemporary Computer Music," Computer Music Journal 24:4 (2002): 12-18.*
3. *Vilém Flusser, Towards a Philosophy of Photography, trans. Anthony Matthews (London: Reaktion Books, 2000).*
4. *Lewis Mumford, Technics and Civilization, (Chicago: University of Chicago Press, 2010).*
5. *David F. Noble, The religion of technology: The divinity of man and the spirit of invention, (New York: Penguin, 2003).*
6. *Caleb Stuart, "Damaged Sound: Glitching and Skipping Compact Discs in the Audio of Yasunao Tone, Nicolas Collins, and Oval," Leonardo Music Journal 13 (2003): 47-52.*
7. *René Thom, Structural Stability and Morphogenesis. an outline of a general theory of models, trans. D.H.Fowle (London: Benjamin, 1975).*
8. *Joke Brouwer, ed. The Art of the Accident (Rotterdam: Dutch Architecture Institute/V2, 1998).*

POWERING ECOLOGICAL FUTURES

Lea Schick & Anne Sophie Witzke

This article riffs off from Peter Sloterdijk's important concept of 'air-condition' and Bruno Latour's influential idea about 'ecologizing', which establish a theoretical framework to discuss the engagement of digital art in environmental problems. Looking at two projects – *Nuage Vert* by the duo HeHe and *Natural Fuse* by Haque Design – the article argues that digital art can articulate the complexity and ambiguities of an ecological future.

Left: *Natural Fuse* by Haque Design   Right: *Nauge Vert* by HeHe

Left: Natural Fuse by Haque. Right: Nuage Vert by HeHe

Left: *Natural Fuse* by Haque   Right: *Nuage Vert* by HeHe

Powering Ecological Futures

We are living in an era where air conditions and atmospheres enter our awareness and are made explicit. Through rising awareness of global warming and of how we modify our indoors and outdoors climates, it is clear that we must redesign the systems we use for air-conditioning different spheres of our planet's air. This includes our power supply systems. French sociologist Bruno Latour claims:

"As soon as artists, designers and architects are busying themselves with the light element [Air], we are going somewhere. From the philosophical point of view, Air will take the place of Earth as the 'fundamental element'" (2004)

By looking at two digital artworks, dealing with air conditions and electricity consumption, this article will use the ideas of Bruno Latour and German philosopher Peter Sloterdijk to discuss what role art may play in rethinking 'air-conditioning systems'.

AIR AS AN OBJECT OF DESIGN

During WWI, April 22, 1915, air lost its innocence when a toxic green cloud migrated from the Germans into the British camp in Ypres, transforming the air and environment into their worst enemy (Sloterdijk 2004, 89). According to Sloterdijk, this day marks the beginning of a new era of our anthropological history; an era in which air and atmosphere is made explicit. In his trilogy, *Sphären*, Sloterdijk describes our time as an age of greenhouses and climate control (2004). In order to comprehend the ecological crises and our being-in-the-world today, it is essential to understand how air and atmosphere has been made explicit. Air has moved from a passive background to the foreground of our attention. With the invention of 'air-conditioning systems' such as heating, ventilation, and light, humans have become masters of controlling air and atmospheres. Through these technological systems we can isolate ourselves from common air, conditioning our private spheres as we like. According to Sloterdijk, it is distinctive for current state of affairs that air is moving from being the invisible surrounding (Umwelt), something we take

for granted, to becoming an object of technology and something we can deliberately design. Hence air has become the center of political disputes:

"*Politics, from now on, will be a section of the technology of climate-control*" (Latour 2004b)

Since CO_2 emissions are linked to energy consumption, electricity supply systems counts as essential climate-control or air-condition technologies Sloterdijk 2009). With energy consumption not only conditioning our indoor climates (Sloterdijk 2004) but also our common atmosphere and environment in a rather unfortunate way, air-conditioning systems and their electrical power supplies find themselves in the midst of political disputes and redefinitions.

Various disciplines such as architecture, engineering, politics, and social science are working at full throttle to redesign our way of living. Each discipline plays an important role in outlining the contours of a range of social, political, and technical changes that point toward a more ecological future. Art and experimental design are also concerned with these challenges and contribute to the field with a special sensitivity towards the complexity and ambiguity of the problems. Through the last decade an increasing number of artists and designers have been working with energy visualization and digital technology, trying to make explicit what is still implicit to most of us. Using computer technology - with its expanding databases, interconnectedness and embeddedness – the artists and designers present and translate energy data into interactive and networked projects with the aim to direct the public's attention to issues of energy consumption and ecological problems. Through the following presentation of two digital art projects, *Nuage Vert* and *Natural Fuse*, we will discuss how art can participate in articulating an ecological future.

NUAGE VERT

Ninety-three years after and 2133 kilometers away from Ypres, the sky turned toxic green again. This time it was vapor emissions from the Salmisaari power plant in Helsinki that was illuminated with a high power green laser animation. During one week of February 2008 the citizens of Helsinki experienced a city-scale light installation beautifully enlightening the sky and reminded the inhabitants of their rising electricity consumption and it effects on our air conditions. The installation, *Nuage Vert* (Green Cloud), was produced by the artist duo HeHe, consisting of Helen Evans and Heiko Hansen, together with Helsingin Energia. The power plant provides electricity for a former industrial harbor redeveloped into a residential district with growing energy consumption. Using the data from the power plant, the laser drew an outline of a green cloud onto the real cloud itself. The green cloud changed size according to the residents' fluctuating electricity consumption. When the collective consumption was low the cloud grew larger, but shrunk when the electricity loads were high. Functioning as a public visualization of the local electricity level the residents were expected to respond to *Nuage Vert* by turning off electrical devises to increase the volume of the cloud (Holmes 2011, 53).

NATURAL FUSE

Another project that comments on our everyday use of electricity and carbon footprint is *Natural Fuse* conceived by the design studio, Haque Design. *Natural Fuse* is a hybrid artwork networking a series of distributed plants with energy consuming devises and participants via the Internet. Each participant gets a 'Natural Fuse' unit, which consists of a houseplant and a power socket. The amount of power

available to the socket is limited by the plant's capacity to offset the carbon footprint produced by the energy expended by the electrical device. If the appliance plugged into the socket draws more power than the plant offset itself, the unit will not power up (Haque et al. 2011, 65). However, all participating units are connected through the Internet. The units are able to share their capacity and determine how much excess capacity of carbon-offsetting is available within the community of units as a whole since not all *Natural Fuses* will be used at the same time. In this way the project is about energy conservation and also about structures of participation.

Instead of the usual on/off switch the sockets have a selfless/selfish switch. When the system is in self-less mode the energy consumption is well below the fixed quota and the unit will provide only enough power to not harm the community carbon footprint. In selfish-mode the owner of a plant can use as much energy as wished. However this mode might harm the community's collective carbon footprint and kill other plants. The fuse takes care of the plant through a remotely activated water-controlling system but the water system only works if there is enough energy left to use in the fuse. If the owner uses more energy than the system can offset the *Natural Fuse* system will start to randomly kill plants. Each plant has three 'lives' before a 'fuse kill' function is activated and a deadly vinegar shot is injected into the plant. Emails are sent both to the owner of the dead plant and the owner that sent a 'kill' signal.

MAKING AIR EXPLICIT THROUGH ELECTRICITY CONSUMPTION

Both *Natural Fuse* and especially *Nuage Vert* make explicit how air and CO2 emissions have become a fundamental concern in relation to power supply systems. In these two installations one can no longer talk about electricity consumption without taking into account how it affects our air-conditions and how we deal with CO2 emissions and pollution. By coloring and animating the chimney vapor, HeHe draws the public's attention to the smoke, which is often just an unnoticed part of the cityscape. The installation also explicates how the air-conditioning in our private houses or spheres is not as isolated as we may think. Sloterdijk describes our society as 'foam' consisting of 'connected isolations' (Sloterdijk 2004, 568). Each bubble or 'sphere' is an isolation but the air-conditioning of one sphere always affects conditions of other spheres. All isolated air-conditioning systems are connected through their electricity use and affect each other. The green cloud artistically illustrates this and tit is made 'deadly' clear in *Natural Fuse*.

Nuage Vert is part of HeHe's series of artworks, *Poll Stream*, working with smoke, man-made clouds and energy use. Like Sloterdijk, HeHe questions the popular notion that weather is 'natural'. By visualizing the man-made aspect of weather HeHe "propose[s] climate as man-made phenomena and therefore a social-political space" (HeHe). Existing simultaneously as a visualization of the residents' participation and the ultimate aesthetization of pollution, *Nuage Vert* is a complex socio-political sign of both environmental effort as well as wasted energy.

STOP MODERNIZING, START ECOLOGIZING

Throughout Modernity air-conditioning infrastructures such as our power supply systems have been made invisible and imperceptible. Electricity use today is a passive one-way connection and only a few people pay any thought to how power plants are adjusting their production to our consumption. Both production and effects are completely detached from the use of electricity, just as individual household consumptions are totally independent of one another. The electricity system has been turned into what

Bruno Latour calls a 'Black Box', a system we don't need to know how works or how it is connected to the rest of the world (Latour 2007). Art projects like *Nuage Vert* and *Natural Fuse* attempt to open this black box and reveal the hidden structures of the energy system. In *Natural Fuse*, these structures are shown to be quite complex involving organic, electric and social systems. Energy consumption here is not controlled by production but it is directly connected to the offsetting available and the illusion of our power supply system as an autonomous back box system is shattered. Through the information technologies in the system the black box is opened up and its many attachments to the world is revealed. *Natural Fuse* highlights how the participants' decisions about being selfish or not have a direct impact on the other participants and organic actors in the energy community. If people cooperate on energy expenditure the plants thrive and everyone may use more energy but if they switch to selfish mode plants will die and diminish the network's electrical capacity. Here the electricity system is fully entangled with the energy community rather than being detached and autonomic as it is normally conceptualized.

The latter view on the electricity supply system is emblematic of what Latour describes as a modernization of the world. The modernizing way of constructing the world has been characterized by the approach:

"Go forward, break radically with the past and the consequences will take care of themselves!" (Latour 2008,3)

 Our built environment has been based on cold objectivity or matters-of-fact, as Latour calls it, and the purpose of our surroundings has been to provide us with progress and speed through smoothly working effective systems that we would never have to pay attention to. Modernization has been a project of emancipation and detachment. It has been all about freeing objects and designs from their various attachments and complex relations to, and effects on, the rest of the world. But this way of designing, says Latour, has turned out to be not only highly unsustainable but also quite a deception (2008), because 'we have never been modern' (1993). While we might have believed that we were emancipating and detaching, we have in reality been producing ever more hidden attachments and effects – such as the complex network in *Natural Fuse* suggests. Those ignored connections are today revealing themselves as rambunctious monsters, traveling around the planet and coming back to hunt us, such as climate change and energy shortage (Latour 2009, 7). Therefore, says Latour, if we want to deal with global warming we will have to stop pretend that we are modernizing and instead start 'ecologizing' (1998).

While modernizing was about emancipation and detachment, ecologizing is about drawing things together, about attachments and entanglements, and about a precautious attention to and explication of details (Latour 2007). By explicating the connections between electricity use and offset, *Natural Fuse* presents a complex conceptualization of energy systems where our usage is not only highly entangled in other people's consumption but also thoroughly attached to non-human actors such as the plants. The often unnoticed effects of our unrestricted use of power is drawn directly into the living room and made clear through the dying plants.

POLITICS OF ARTIFACTS

Latour criticizes Modernism and Humanism for focusing too much on human actors.

"To define humans is to define the envelopes, the life support systems, the Umwelt that make it possible for them to breathe. This is exactly what humanism has always missed." (Latour 2008, 8).

Humans can only be defined through the objects surrounding us and these non-human actors therefore have agency; or in Latour's words, 'artifacts have politics' (2004b). Both artworks portrayed here articulate a sensitivity towards the artifacts – what Latour calls the 'missing masses' (1992) - which constitute part of the power supply systems. When the black box, i.e. the power supply system, is opened up it becomes clear that it does not consist of cold materiality but that it has been designed. The black box is always a result of political discussion and it determines our use and therefore envelopes our being in the world. Artifacts go from being 'matters-of-fact' into becoming 'matters-of-concern'. Objects become 'things'; that is complex and contradictory assemblies of conflicting humans and non-humans (Latour 2007, 6; 2008, 7). When ecologizing, the non-human actors have to be given a voice in our political 'parliament of things' (Latour 2004b) and participate in the discussion of our collective lives (Sloterdijk 2004, 67).

"Democracy can only be conceived if it can freely transverse the now dismantled border between science and politics, in order to add a series of new voices to the discussion, voices that have been inaudible up to now [...] the voices of non-humans" (Latour 2004b,64).

To this purpose, we argue, art has a capacity to transverse the border and represent the entanglement of humans and non-humans. By giving voice to the various non-human actors of the system - e.g. plants, electricity devises, water systems - *Natural Fuse* and *Nuage Vert* are concrete manifestations of how power supply systems are not merelymatters-of-facts but always matters-of-concern and how they are deeply affected by political, environmental, and ethical issues. Both art projects in this way function as small laboratories, where artists and designers experiment with visions of new ecological futures and carefully try to redesign the complex connections between humans and non-humans.

CAREFULLY RADICAL, RADICALLY CAREFUL

Ecologizing is a slow process paying attention to the details and ways things are connected in hybrid networks or 'interconnected foam', to use Sloterdijk's term. Referring to Sloterdijk, Latour says that a redesign of our life support systems has to be 'radically careful and carefully radical.' The 'radical' here refers to the fact that we have to take non-human actors into consideration and the 'careful' referring to paying meticulous attention to how we design connections (Latour 2008, 8). We are still in the midst of articulating a new narrative for a more ecological future. However there are no easy shortcuts only detours. We can never be certain that we take the right direction; that we have chosen the right solution. A redesign of a more ecological energy system therefore needs to be open, reversible and adaptable. We argue that this is where art and experimental design can contribute.

As Usman Haque, Haque Design puts it:

"The point is that there is no 'easy energy future'. [...] It is often expressed that it is the task of designers to "make things simple for people" – which I find patronizing and counter-productive. If anything, it is the task of designers to show how **complex** *things are, and to help build tools for dealing with that complexity"* (Haque 2011, 86).

The *Natural Fuse* system is clearly not a implementable or desirable design solution but rather an explication of how complex a redesign of power supply system becomes when Co2 emissions, carbon offset, and structures of participation enters into our awareness. Instead of giving us easy answers it encourages us to discuss how it is possible to ecologize energy usage.

Through the aesthetic choices *Nuage Vert* also refuses straightforward answers. People are encouraged to 'feed' the cloud by turning off electricity devises: the less electricity usage the bigger and more beautiful the cloud becomes. However large amount of chimney vapor normally signifies the exact opposite of environmental friendliness so this equation might be puzzling to some. Furthermore, the illuminating acid green of the cloud gives associations to toxic wars and pollution just as green has become the iconic color of sustainability. *Nuage Vert* stays ambiguous and doesn't offer simple moralistic messages.

Art is distinguished by a close relations to the time out of which it arises and by often taking the vanguard in sensing, recording and expressing the changes and conflicts lurking underneath the surface of society. Without giving a ready-to-go manual, *Nuage Vert* and *Natural Fuse* power a discussion of how we can rethink the future of energy consumption in a more carefully designed ecology with a attention to details and attachments. Both artworks formulate a new way of comprehending the world, which with homage to Latour, could be termed 'ecologization' where humans are no longer sole actors but part of a larger collective with our fellow species and neighboring artifacts.

References and Notes:

Haque, Usman, N. Samsen, and A. Hasegawa. 2011. *Structuring Participation for an Energy Commons*. In Sentient City: Ubiquitous Computing, Architecture, and the Future of Urban Space, ed. M. Shepard, 64-89. Cambridge, Massachusettes: MIT Press.

HeHe. *Pollsteam*. http://hehe.org.free.fr/hehe/pollstream/index.html.

Holmes, Tiffany. 2011. "Dialogical encounters: art and energy awareness via eco-visualization." *XRDS: Crossroads, The ACM Magazine for Students* 17 (4). http://dl.acm.org/citation.cfm?id=1961678.1961688&coll=portal&dl=ACM.

Latour, Bruno. 1992. *Where are the Missing Masses? The Sociology of a Few Mundane Artefacts*. In Technology and Society. Building our Sociotechnical Future, ed. D.G. Johnson and J.M. Wetmore, 209-226. Cambridge, Massachusettes/London: MIT Press.

———. 1993. *We Have Never Been Modern*. Harvard University Press, December 31.

———. 1998. *To modernize or to ecologize? That's the question*. In Remaking Reality: Nature at the Millenium, ed. N. Castree and B. Willems-Braun, 221-242. London and New York: Routledge. http://www.bruno-latour.fr/articles/article/073.html.

———. 2004a. "Air-condition": our new political fate. http://www.bruno-latour.fr/presse/presse_art/GB-03%20DOMUS%2003-04.html.

———. 2004b. *Politics of nature : how to bring the sciences into democracy*. Cambridge Mass.: Harvard University Press.

———. 2007. *A Plea for Earthly Sciences presented at the Annual meeting of the British Sociological Association, East London*. www.bruno-latour.fr/articles/article/102-BSA-GB.pdf.

———. 2008. *A Cautious Prometheus? A Few Steps Toward a Philosophy of Design (with Special Attention to Peter Sloterdijk*. In . www.bruno-latour.fr/articles/article/112-DESIGN-CORNWALL.pdf.

———. 2009. "Spheres and networks: two ways to reinterpret globalization." *Harvard Design Magazine* 30: 138–144.

Sloterdijk, Peter. 2004. *Sphären 3.: Schäume*. Suhrkamp Verlag KG, May 31.

———. 2009. *Spheres Theory: Talking to Myself about the Poetics of Space*. Talk. Harvard University Graduate School of Design, February 17. 01.02.2011.

CONCEPTUAL RELATIONS: MUSICAL REPRESENTATIONS DO NOT NEED MUSIC THEORY

Sebastian Schmidt, Thomas Alexander Troge & Denis Lorrain

A theory using conceptual relations for musical design processes is proposed. It is suggested that, for non-musicians, musical representations mostly arise, while listening, through the process of abduction, including combinations of conceptual relations and influenced by emotional ratings.
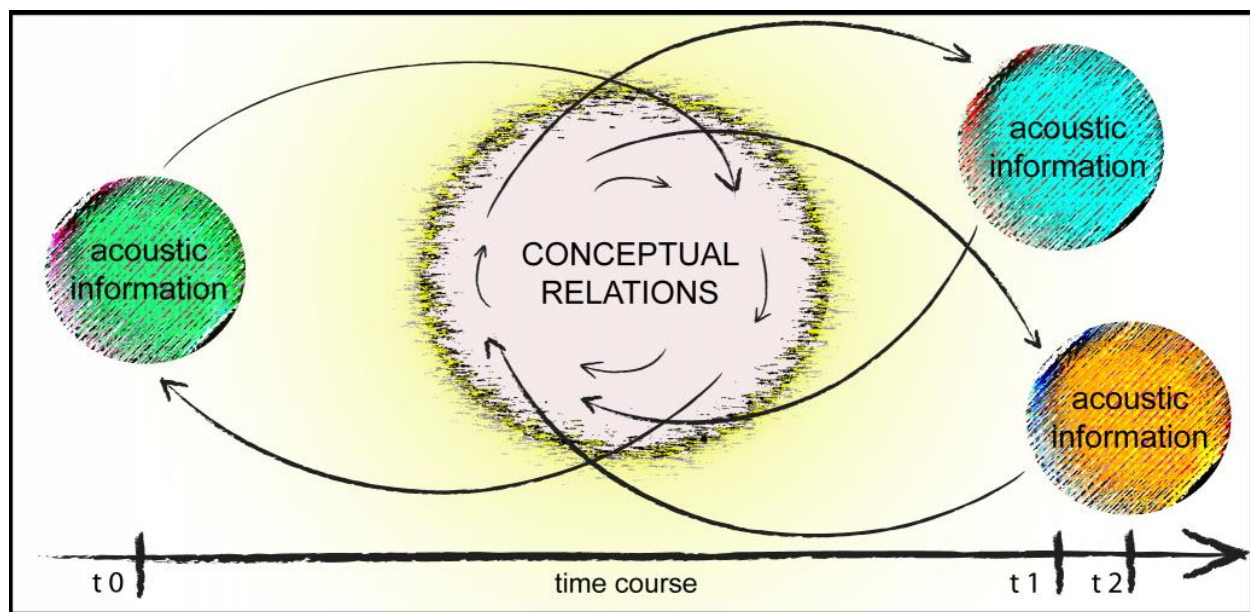
Relation between three acoustical information. Schmidt, Sebastian. [sic, ed]

INTRODUCTION

The German sociologist, musicologist and composer Theodor W. Adorno states about the musical listener:

"Its horizon is the concrete musical logic: one understands what one perceives in its course, but certainly not in a literal causal necessity. Location of this logic is the technique; the listener who is introduced in music theory conceptualizes individual elements, of what is heard, most immediately as technical, and in technical categories, revealed much of the meaning." [1]

This statement first implies that the construction process depends on explicit learned musical logic. Secondly that, in order to understand musical processes, listeners have to develop categories of individual sound elements. Thirdly, that many musical meanings are revealed only after having learned musical logic.

But, on the other side, music can offer different grounds and levels of understanding. In this way, musical thought does not follow the rules of formal logic normally.

 "People use their implicit understanding of how the world works to understand structures, rather than the formal principles of logic." [2]

From this point of view, musical meaning certainly depends on musical learning processes, such as musical logic, but the implicit understanding of how the world works is an important argument for an extended view on musical construction.

From fundamental concepts such as top to bottom, left to right, every one develops ever-expanding concepts of how the world works. In addition, Gilles Fauconnier and Mark Turner have shown that, during the connection of various concepts, such as is constantly performed during musical construction, room always exist for many different possible lines of elaboration.

However, assessment and recognition of elements or processes, whether conscious or unconscious, are also caused by emotional states. Therefore,

 "It appears likely that emotion and cognition are two sides of the same coin of elaboration." [3]

Consequently, to discover and understand the virtual relations between sounds, or, that is to say, build their significance, emotional states must be involved.

When musicians, or non-musicians, describe parts of music as sad, happy, elated, and so on, they are referring to emotional states. Such states are the products of complex processes, and imply that elements and sound structures were recognized, rated and related to each other.

However, although both musicians and non-musicians develop emotional states during the course of listening, only the musicians have access to explicit learned musical logic. Hence, it is important to investigate how listeners lacking this musical logic distinguish emotional states during the course of listening to music.

"The human being conceptualizes and classifies the experience of the 'inner as well as the outer world' because envisaging and choosing occur primarily in terms of such classes, to wit in case classes of emotions or cognitive categories." [4]

These classification and categorization of information processes are a general mental operation of human beings. The first reason for this, in a psychological sense, is that it is necessary to foresee the probability of coming events, whether the behavior of people, or of musical patterns. David Huron proposed, for example, to classify expectation emotions in five psychological systems. Secondly, psychological behavior addresses different biological problems aiming at adapting the behavior to changes in the environment.

From this point of view, we propose that musical representations are constructed as a combination of conceptual relations between classes or categories. And this construction is performed during classification or categorization, caused by unconscious and conscious ratings of possible relations. Such is the

functionality of the nervous system. The nervous system can only process patterns: pattern comparison allows the creation of different classes, and of their relations to each other.

WORKING OF THE NERVOUS SYSTEM IN RELATION THE MEMORY

Categorization is not only a psychological organization of the environment, but is already created during the information processing in the nervous system.

Human beings compare and relate information processes by using memory. Memory influences how we decide when groups of events end, and other groups begin, and how these events are conceptually related. It also allows everyone to comprehend sequences of events in their totality, and to build expectations about what will happen next.

From the current physiological perspective, memory is the ability of nerve cells in the brain to alter the strength and number of their interconnections in ways that span over time. However, memory is not a monadic entity, but is understood as a subdivided system that depends on content and time. It is carried out by different neural networks, which process acquisition, storage, consolidation and deposition in very different structure combinations. Therefore, memory processes are functional rather than structural.

CATEGORIZATION IN THE AUDITORY MEMORY FROM THE COGNITIVE PERSPECTIVE

"In the auditory memory, the inner ear converts sounds into trains of nerve impulses that represent the frequency and amplitude of individual acoustical vibrations." [5]

This information is usually stored less than a second in the auditory ultra-short-term memory, and is not categorized in any way, but persists as continuous sensory data. Jamshed J. Bharucha discovered 1999 that many specialized groups of neurons extract individual acoustical features such as pitch, overtone structure, etc. from the continuous data of ultra-short-term memory.

"During the subsequent process, these features are bound together with different simultaneous features, and correlated into single auditory events." [6]

Gerald M. Edelman deduces that feature extraction and perceptual binding reduce the large mass of sensory information, and elaborate a perceptual categorization. Certain perceptual events activate conceptual relations in those parts of the long-term memory that have been activated by similar events in the past.

"This can take place in a conscious or unconscious way. But most of the content of long-term memory is unconscious and forms an activation context for current awareness." [7]

This context, or conceptual relation between single auditory events and the past, takes the form of expectations and other related knowledge that can influence the direction taken by current consciousness.

Some information from the long-term memory reaches consciousness by the highest state of perceptual activation. Therefore, current awareness can consist in a vivid perceptual categorization and conceptual categorization arisen from long-term memory.

Information that has just been in the focus of conscious awareness may then persist as short-term memory, where it is no longer in consciousness, but will be held ready for recall. This recall availability lasts only about 3-5 seconds (sometimes longer) on the average, unless the information is rehearsed, that is, recycled through the process of conscious awareness.

At this point, there seems to exist a difference in the construction process between musicians and non-musicians. For instance, musicians have access to previously learned sound schemata, and may group sounds according to those. Because of the limitation of 7 ± 2 actively held chunks in the short-term memory, non-musicians can not group certain chunks in a pre-learned superior musical schema. Their musical 'schema-driven-grouping' is thus limited, and the relationships constructed over longer time spans appear to be fewer and less pregnant than for musicians. However, explicit schema-driven-grouping is only one path to musical construction: it is also possible to relate sounds and tension-release patterns in music, without naming them explicitly.

For both, musicians or not, if information are novel in some way or, to be more precise, if conceptual relations between sounds build a novel significance, then this novelty joins other conceptual categories in the long-term memory.

As items are compared, however, an important factor also depends on the emotional process of evaluation. Emotion also dictates why the perceptual activation selects certain particular information from long-term memory.

CATEGORIZATION AS A PROZESS OF MEMORISATION FROM THE PERSPECTIVE OF EMOTION

From an accepted perspective:

 "Individual states, or categories of emotional behavior, are appropriate functions, or responses to changes in the environment that have worked over the course of evolution." [8]

LeDeux distinguishes two kinds of response to stimuli, namely 'Congenital trigger' and 'Learned trigger'.

 "The first is an evaluation mechanism, given to us via evolution, designed to detect a particular pattern and trigger reactions that function to prepare an organism for changes in the environment. The evaluation mechanism can also learn from stimuli and often function in connection with the congenital trigger from which the reactions are expected. These are called learned triggers." [9]

Unconscious or conscious expectation processes are fundamental requirements for human survival. Human behavior is continuously guided and optimized by anticipatory responses. But,

 "The expectations we form while listening to music have no obvious implications for survival, even though a certain degree of arousal, such as tension generated by anticipated events, is basic to musical functionality." [10]

Arousal alone is not the result of emotion. The physiological effects of arousal may occur during and after music listening, but the result is not the emotional response.

For LeDeux, emotional experience caused by listening to music is a 'Learned trigger'.

"In addition, in George Mandler's (1984) view, held also by Leonard B. Meyer (1956), incongruities between expected and actual events lead not only to arousal response, but also to a cognitive reevaluation of the stimuli. It is the combination of arousal and cognitive activity that leads to an emotional experience." [11]

That point is important because, conscious or unconscious classification, explicitly named or not, tend to undermine and weaken emotional response. Therefore, we can say, in the case of non-musicians and of musicians also, the memory helps to compare perceptual and conceptual information, to store and retrieve classes and categories derived and reduced from pattern. But how information are related to each other, during the course of listening, also depends on individual emotional ratings of possible relations to what will happen next, and could emerge in the consciousness as emotional states.

CONDITIONS AND FUNCTIONALITY OF CONCEPTUAL RELATIONS BETWEEN SOUNDS

Starting from the basic function of memory for human beings, which is to be prepared for anticipated events, listeners mostly evolve musical representations through a process of abduction – there are also situations in which musicians and non-musicians cannot focus on music. Therefore, it seems possible, under certain circumstances, for listeners to hear music in a stream of consciousness mode.

Abduction means that acoustical information, in the first step of reasoning, generates a hypothesis about a probable musical concept, in the form of a prediction referring to a certain expectation horizon. The possible consequences of this hypothetical concept can be determined deductively, and its musical elements searched inductively. Regarding the process of perceptual categorization in the auditory memory, it is likely that, already in these early processes, the nervous system tends to create a hypothesis about what will happen next. This happens because certain perceptual events activate conceptual relations, in those parts of the long-term memory, which were activated by similar events in the past, and/or were already conceptualized in relation to other events. That is an important analysis, in the sense that conceptual relations assign a present identity to acoustic information because of individual experience. They do not possess a priori a static identity. In addition, a constructed present identity is a product of various conceptual relations – based on models of cause & effect, prediction, space, time, role, identity, analogy, change, role, property, category – which, depending on their weighting, could produce different avatars of a same musical identity or concept.

The Figure 1 shows an abduction process during the course of listening. That is to say a process of conceptual relations, in the scope of current awareness, between three perceptual and conceptually categorized acoustical information activated from the long-term memory. A certain degree of physiological conditions is assumed, such as arousal and tension.

At time t 0, the acoustical information receives a present identity, through the process of memorization and retrieval. This identity construction, explicitly named or not, provides the basis of a hypothesis about the plausible musical concept. Depending on their musical experience and on their current individual constitution, non-musicians and musicians alike create a mix of different conceptual relations, in

the form of a deductive analysis aiming at anticipating the identity of some future acoustical information. That mixture produces emotional states and, for instance, could include relations of similarity, cause & effect, time, role, property, category, or explicit musical schema-driven-grouping with possible events in the future.

During this stage of inductive search, it is possible, both for non-musicians and musicians, that the acoustic information heard at t_1 and/or t_2 change the mixture of conceptual relations to previous acoustical information, in the sense that the anticipated concept becomes less likely, or unrealized. This means that perceptual and conceptual categorized acoustical information, activated from the long-term memory, send their present identity to the mixture of conceptual relations, and initiate a new abduction process, which could change physiological conditions such as tension or arousal, musical concepts and/or emotional states.

In terms of musical perception of time, the conditions outlined above, and the functionality of the musical construction are important for an extended perspective. Musical time is not composed of a density of differentiable events, but results from the succession, and possible repetitions, of abduction processes.

CONCLUSION

With the resources of modern science, we have tried to show in this paper that classification and categorization of information processes is a general mental operation in human beings. Hence, we suggested, non-musicians also have the ability to rate, separate and group individual sound events in relation to musical representations. Those representations can be different from those of trained musicians, as regards their structure, time span, and effect.

Our main point was to sketch an initial draft of a new musical theory, based on mixture of conceptual relations, which, in a process of abduction, assign their dynamic identity to acoustical information. In addition, such relations are responsible for musical concepts and emotional states arisen while listening to music, and for the musical perception of time.

References and Notes:

1. *Theodor W. Adorno, Einleitung in die Musikpsychologie (Frankfurt: Suhrkamp, 1962), 12.*
2. *D. Kahneman, P. Slovic and A. Tversky, Judgement Under Uncertainty: Heuristics and Bias (Cambridge: Cambridge University Press, 1982).*
3. *Joseph LeDoux, "Cognitive-emotional Interactions in the Brain," in Cognition and Emotion 3, no. 4 (1989): 267–289.*
4. *Leonard B. Meyer, "Music and Emotion: Distinctions and Uncertainties," inMusic and Emotion: Theory and Research, eds. Patrik N. Juslin and John B. Sloboda (New York: Oxford University Press, 2001), 341-360.*
5. *Pierre Buser and Michel Imbert, Audition (Cambridge, MA: The MIT Press, 1992), 156–171.*
6. *Albert S. Bregman, Auditory Scene Analysis: The Perceptual Organization of Sound (Cambridge, MA: The MIT Press, 1990), 213–394.*
7. *Bernard Baars, A Cognitive Theory of Consciousness (New York: Cambridge University Press, 1988), 137-176.*
8. *Phillip N. Johnson-Laird and Keith Oatley, "Basic Emotions, Rationality, and Folk Theory," in Cognition and Emotion 6, no. 3-4 (1989): 201–223.*
9. *Joseph LeDoux, Das Netz der Gefühle: Wie Emotionen Entstehen (München: DTV, 2001), 137.*
10. *Jeff Hawkins, On Intelligence (New York: Henry Holt and Company, 2004).*
11. *William Forde Thompson, Music, Thought, and Feeling: Understanding the Psychology of Music (New York: Oxford University Press, 2009), 132*.

RESPONSIVE ILLUMINATED ARCHITECTURE

Christian Schneider & Stefan Müller Arisona

This paper presents and discusses two academic projects that employ 2D and 3D projection mapping techniques that respond to real-time environmental sensors or interactive user input. We briefly summarise the technical background and then focus on implications of using these techniques in the context of architecture education.
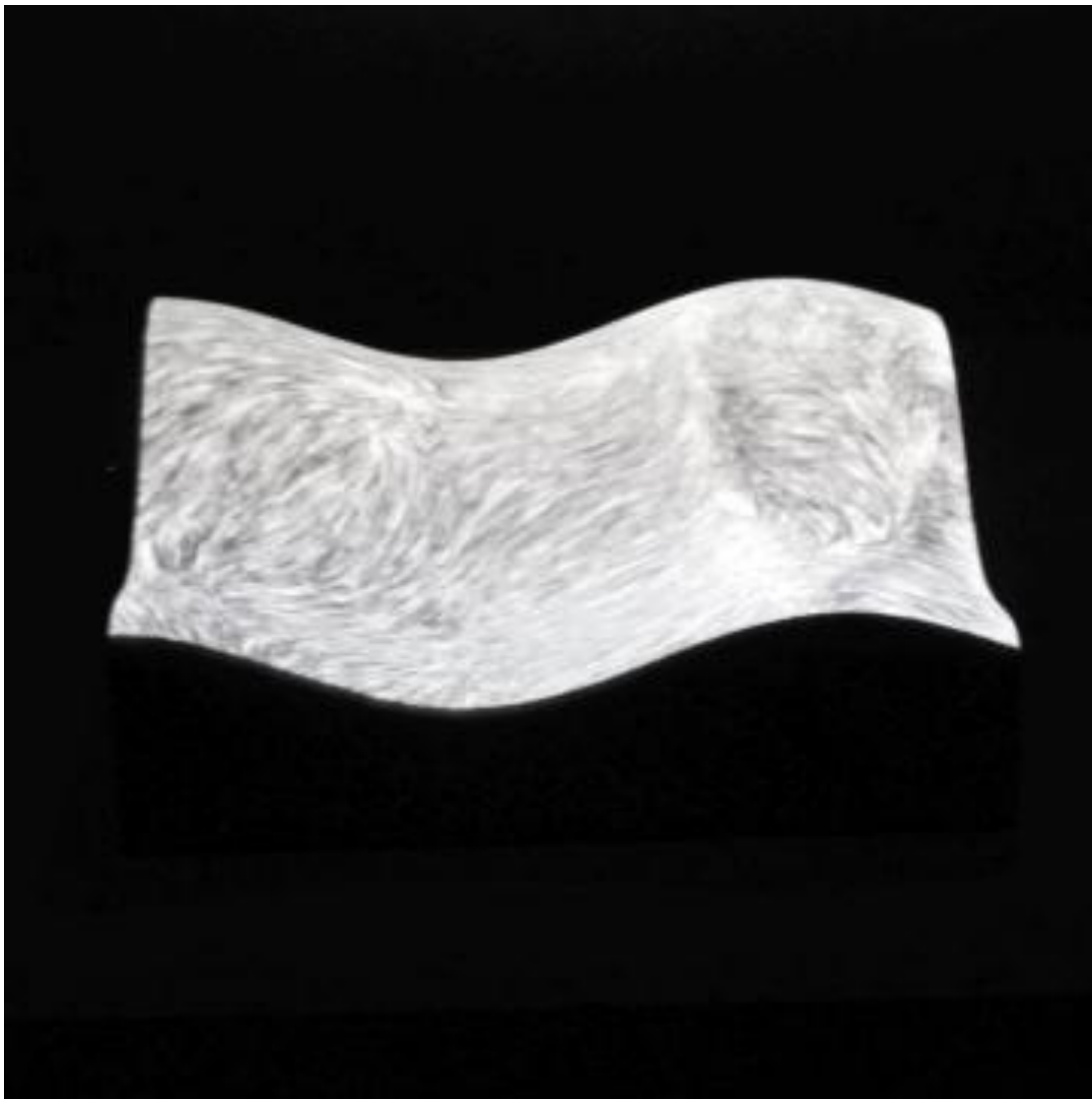
Projected Realities installation: Projection onto 20x20x5cm plaster model.

Introduction

Illumination of buildings with projectors or media facades has become a popular means of visual communication: in the art context, many festivals and curators around the world exhibit pieces, such as (Lonzano-Hemmer, 2008), and a growing number of applications can be observed in the commercial context (Starcom Amsterdam, 2010). As technology advances, the scale of illuminated surfaces increases, the visual perception of objects can be altered in real-time, and the use of sensors or smart phones enables the interaction between visuals and the environment. Parameters, such as temperature, movement or gestures drive the visuals and allow people to perceive their body and the environment in a new way.

In this paper, we present two academic projects, "Sensitive Tapestry" (Wipfli and Schneider, 2008) and "Projected Realities" (Schneider, 2009), which aimed at integrating above techniques into the architecture curriculum and at leveraging the architect's knowledge for a more seamless integration of interaction and visualisation. The goal of both projects was to create a novel experience that arises from architecture augmented with digital information, and from architecture that acts a user interface to reveal information about the building, its occupants and its environment.

Technical Background

The foundation of both projects is formed by a mapped projection that is overlaid on an existing structure, such as a façade or a 3D object. One of the main challenges is the proper calibration of the projected image with the static surface. Currently, a practical approach employs interactive assignment of dedicated virtual points to real points in space, and allows for precise calibration within a few minutes. From there, the camera and projection parameters can be calculated using the methods described by Bimber and Raskar (2005, Section 5.2 and Appendix A). In our approach, we avoided computational surface estimation by using a 3D surface that was parametrically known in advance. For example, for Projected Realities, we used a plaster model of ca. 20x20x5cm, with a parametric surface given by

$$f(x, y) = 10.2 * \sin(0.04 * x) + 10.2 * \cos(0.04 * y).$$

Once calibration is completed, the objects can easily be augmented with content using standard 3D drawing techniques, e.g. using OpenGL. In our context, we used the Processing environment due to its low entry requirements for non-programming experts. The rendering core is then enhanced with real-time sensor input: In the case of the Sensitive Tapestry, we used a thermal imager manufactured by Testo AG. The imager delivers a video signal containing thermal information. The signal was processed in different ways using image-processing methods, and was either directly mapped and projected or used for additional extraction of features that were used for drawing of specific features.

Realisation within the Architecture Curriculum

Both projects, the Sensitive Tapestry and the Projected Realities were carried out as elective courses for undergraduate students at the Department of Architecture at ETH Zurich. The goal of the courses was to explore the possibilities of projected illusions, both from a technical as well as an architectural viewpoint, and especially in the combination of these two.

The technical implications are quite obvious: First, students are confronted with the difficult task of adjusting a projected image to a physical surface, a task that seems straightforward at first, but can not be properly achieved by just playing around. Thus, it requires a good understanding of projection setups, virtual camera parameters, and how techniques as described above are applied. Second, hardware issues and limitations of both sensing and projection devices need to be understood; for example even current high quality projectors have considerable colour issues when in bad lighting conditions. Third, the understanding needs to be transferred into real code, which must integrate different subsystems and operate in real-time – a non-trivial task for architecture students, but at task that turns out very rewarding as soon as first visible results are achieved.

From an architecture perspective, the main goal is to expand the basic understanding of a static built structure with function and dynamic behaviour: How can these usually invisible, but inherently important properties be made visible? How can they be communicated? And in particular how can connections between structure, function and behaviour be made visually accessible? Addressing these questions requires studying relationships within various specialisations within architecture, e.g. between building design and building technology. This helps obtaining a more complete picture of the many facets today's modern buildings are comprised of. Ultimately, such an experience can be fed back into the concrete applications in the design process and may also result in considerations for future directions of building design.

The deeper study and understanding of architectural relationships also quickly results in a dedicated exploration of artistic possibilities. We believe that such a combination allows for the creation of artworks that goes beyond mere technical demonstrations of the possibilities of 3D projection mapping as it is often demonstrated. The inclusion of architectural knowledge allows for the emergence of visual content that does not misuse built structure as a mere projection surface, but augments a structure with usually invisible features, that in turn are supported by this structure. Therefore using these techniques aims towards convergence of the physical and the virtual by focussing on the connections between the two.

Conclusions and Future Work

The two courses received very positive echo, and were very satisfying in terms of student dedication and results. In particular, the opportunity to present the works to a broader audience in public space resulted in an additional boost.

For future work, we currently see two areas: First, it would be useful to establish a coding framework that incorporates the basic projection mapping and calibration functionality, and allows the students to focus on either experimenting with more advanced mapping techniques or on actual content and on more complex interaction techniques. Second, we consider tapping into building information systems and using this information directly to feed it into the projected content.

Acknowledgments

References and Notes:

1. *Oliver Bimber and Ramesh Raskar, Spatial Augmented Reality: Merging Real and Virtual Worlds (A K Peters: 2005).*
2. *Casey Reas and Ben Fry, Getting Started with Processing, O'Reilly Media (2010).*
3. *Rafael Lozano-Hemmer, Under Scan, a Large-scale Public Art Installation, Trafalgar Square, London (2008).*
4. *Christian Schneider, Projected Realities, a 3D Projection Mapping Installation, Digital Art Weeks Xi'an (2010).*
5. *Starcom Amsterdam, Outdoor 3D Projection Mapping Commercial for Samsung LED 3D TV, Amsterdam (2010). http://www.youtube.com/Samsung3devent (Accessed: 2011-09-05).*
6. *Sandra Wipfli and Christian Schneider, "The Sensitive Tapestry: Built Architecture as a Platform for Information Visualization and Interaction," 13th International Conference on Information Visualisation (2009): 486-489.*

WAR & ART IN THE SCREENIC ERA

Adam Schrag

Using the work of Joseph DeLappe, Anne-Marie Schleiner, Wafaa Bilal, and others as "objects to think with," this paper draws on images from both military weapons systems and digital media artists to sketch a critical phenomenology of the surface at the intersection of human sensoria and technological media in the context of war.

Screen War

The U.S. military has been testing a new surveillance system – ominously named Gorgon Stare – that can track and transmit real-time movement across an entire town. [1] The system consists of a spherical array of nine cameras attached to the belly of an aerial drone. Each $17.5 million pod ways 1100 pounds and shoots at two frames-per-second at half–meter resolution, creating live three-dimensional geo-intelligence of an area. What it currently lacks in frame rate it makes up for in coverage. It utilizes tagging and other metadata in conjunction with ESPN-like instant replay software to organize different views and disperse them to various screens such as the tablets of soldiers on the ground and the centralized databases of Air Force analysts. The goal of this technology is to supplement the perceptual limitations of physical battlespace with a corresponding dynamic screen-based representation. Even though the system has thus far proved buggy and unreliable, its very existence reveals a long-enduring military fantasy of total vision – to integrate and suture the optical world and the screen world in order to create a more perfect, totalizing picture.

Such a system is rooted in a first-person screen subjectivity that exposes, dominates, and annihilates its 'other' while limiting its own exposure. It is a disembodied point-of-view that sees but cannot be seen, that targets but cannot be targeted, that shoots but cannot be shot. More Sauron than Gorgon, this omniscient eye that can see everything – that spies, targets, and shoots – is a cyborg construct of human and machine operations situated within the larger screen ecology of war. It is but one screen cluster within the imbricated screen-space of war that includes the weaponized screens of targeting and surveillance, the news screens of information and entertainment, and the video-game screens of fantasy and training. The screen has become a domain of war – a key battlespace of its own, distinct from but inseparably interfaced with 'real' battlespaces of war where target acquisition, televisual news spectacle, and video game graphics intersect and entangle.

Examples of the screenic entanglement of war and media technologies are not difficult to locate: the handheld footage provided by embedded television reporters shares the same intense proximity to battle as that of soldiers' homemade YouTube videos, which in turn recreate the perspective of first-person shooter video games (in several YouTube videos of patrol missions, for example, soldiers have explicitly recreated the first-person video game perspective by attaching their digital camcorders to their helmets). [2] [3] A more disturbing overlap, perhaps, can be found in the visual similarities between the "AC-130 Gunship" level in the video game *Call of Duty*, for example, and the Wikileak-ed "Collateral Murder" footage taken from the onboard targeting screen of a U.S. Apache attack helicopter from a

2007 mission over Baghdad. [4] In *Call of Duty*, players acquire and destroy targets from an aerial perspective. Likewise, in the Wikileaks video we witness, through a similar onboard targeting screen, the slaying of about a dozen people including two Reuters news employees with the Apache's 30-millimeter cannons. The game and the footage share the same black-and-white, cross-haired perspective and the squelchy audio of seemingly casual radio communication by the pilots and gunners as they carry out their destruction. Furthermore, they share a mode of vision structured by the same military fantasy of weaponized vision. Of course, despite their aesthetic similarity, they are not the same. Equating the game and Apache footage both trivializes war ("it's just like a game") and trumps up the game ("it's just like war"). There is, after all, a significant difference between war-like games and game-like wars – one is ostensibly for fun and the other for death. Rather, the video game and the Apache share a screenic kinship; they live in the same media ecology. Game-makers strive for the most intense version of war's reality in their games while war-makers strive for the game's reality in war. This aesthetic and ideological kinship, and the ways that we address it and are addressed by it, is the focus of this paper.

Screenic Media Ecology

The screen, in all of these contexts, is more than a surface of representation; it belongs to and creates the event. Under these medial conditions, the distinctions erode between the screens on which war is waged and the screens on which it is witnessed. For example, the "Collateral Murder" video serves as not only potential proof of a crime, but is also the very screen through which the crime took place. Similarly, the infamous digital snapshots of the abuses at Abu Ghraib served simultaneously as both a record of and an implement of torture. The virtual screen world in these cases is indelibly linked to – and determinant of – events in the 'actual' world. During the first Gulf War, Paul Virilio located a succinct picture of this interplay between the screen and the world in the form of stealth warplanes like the F117a: they are war objects designed not only with consideration for their physical presence in flight but also with consideration for their screen presence (or lack of one). [5] They are designed to stay both in the air and off the screen.

In all these cases the boundaries between war fantasies and war acts, between information and propaganda, between document and spectacle come under question. Military technologies like Gorgon Stare and others raise important questions about the phenomenology of the war screen. How do we address this transmedial screen phenomena? What are the consequences of this evermore distant and robotic weaponry? What is the nature of virtual war or netwar in relation to the notion of a lived, embodied world? What are the modes of protest or resistance to a war machine increasingly comprised of autonomous robotic systems and cyborg constructs? Do drone operators dream of electric sheep?

How do we address these entangled screens of war? And how do we respond to the address of the screen? These are questions of an ecological nature. The phrase 'media ecology,' though perhaps overdetermined, is, as Matthew Fuller elaborates in *Media Ecologies*, a concept that perhaps best describes the complex, layered, "multiple relations of media dimensionality" that structures our "life in media" (including our wars in media). [6] The interpenetrated nature of the screen world, especially in the context of war, requires an ecological concept of the surface, what one might, in the spirit of Fuller, Félix Guattari, and others, call 'the screenic' – a transmedial, ethico-aesthetic concept referring to the transformation of complex medial, technological, bodily, and social operations into a surface of perceivable events. More than specific media technologies, the screenic addresses the interpenetration of bodies, machines, and images of war across various junctures of media convergence and divergence. Furthermore, it addresses the integration and disintegration of human sensoria within the expanding nexus

of screen networks spanning from television to the handheld devices and all the targets, targeters, and spectators interfaced therein. The screenic, then, is a kind of ecology of the surface where we address and are addressed by a host of technocorporeal and technosensory concerns, where the screen can serve as a site of weaponization (through surveillance, targeting, and tele-control), of record (through documentary and journalism) and of resistance (through hacktivism, art, and other tactical interventions).

Screenic Interventions

How then do artists transform the virtual milieu of war into a mode of resistance? Some artists have responded to the militarized screen by disconnecting from it. In other words, they engage the screens and digital objects of war by transposing them to decidedly more durable substrates. They defamiliarize the screen by resituating its images elsewhere. They are screen-displacers. Conversely, other artists, hackers, modders, and activists attempt to think about (and with) war media by penetrating its screen space, if only fleetingly. Rather than reframe the screen in another context, these artists interface with the screenic and, as Rita Raley argues in *Tactical Media*, seek out ways to "evolve the virtual effects of war into a mode of resistance." [7] They are screen-modifiers.

Screen-displacers seek a sustained, un-flickering response to the war screen as we can see in several artists' responses to the digital snapshots of abuse at Abu Ghraib: Richard Serra's crude charcoal sketch of the man on box at Abu Ghraib with "STOP BUSH" scrawled on it like a hurried piece of graffiti or a cave painting; Susan Crile's delicate chalk and pastel renderings of the Abu Ghraib photographs where light white lines and vast negative space are punctured by the dramatic bold colors of an interrogator's black gloves or a prisoner's green hood; Fernando Botero's painted recreations of the Abu Ghraib photographs, where his comically rotund figures take on a moral and emotional weight in their excess; Martha Rosler's reboot of her Vietnam era collages *Bringing the War Home*, where conflict zones, comfort zones, and consumption zones collide when, for example, American soldiers are pasted into the idyllic domestic space of a magazine-ad living room; and, lastly, Jenny Holzer's *Redaction Paintings*, which make a public spectacle of various redacted government documents related to torture, detainment, and the "war on terror." Each of these works creates an intervention that, rather than entering the screen frame through cyber art practices, reframes the screen in a different milieu. They are objects that think about the screen by displacing it.

The practices of digital artists, on the other hand, have sought a more embedded approach that addresses, reframes, and thinks through (and with) emerging militarized modes of perception. Such tactical art practices seek to interfere with, disrupt, or otherwise interface with the screens of war. Rather than displace the screenic, they place themselves within it. Over the last decade, artists like Joseph DeLappe, Anne-Marie Schleiner, and Wafaa Bilal have experimented with the tactic of video game intervention, which utilizes game space to disrupt, if only fleetingly, our acquiescence to the screenic space of war.

In *dead-in-iraq* (2006), DeLappe entered the online first-person shooter *America's Army*, a tax-payer-funded recruiting and PR tool for the U.S. Army. [8] As a neutral non-participant, rather than play the game, DeLappe, under the screen name "dead-in-iraq," proceeded to type the names of dead American soldiers in the game's chat box. If his avatar was killed he would resume typing upon regeneration. Over the course of the project, DeLappe logged the name, rank, service branch, and date of death of over

4000 American casualties of the Iraq War. Some of the players that encountered *dead-in-iraq* were indifferent, some were curious observers, and others went so far as to protect his avatar. Many of the players who encountered DeLappe's project within the game, however, became upset or defensive. To them, *dead-in-iraq* was not only breaking the social contract of the game by not playing, but he was also politicizing their fun. By interrupting the game with the names of the dead, he momentarily punctured a riskless and regenerative military fantasy.

In *Velvet-Strike* (2002), Schleiner, along with Joan Leandre and Brody Condon, created an intervention in the game *Counter-Strike*, a mod of the popular first-person shooter *Half-Life*. [9] Instead of the usual "spray paints" players use to tag territories or mark kills within the game, *Velvet-Strike* invited players to create and use spray paints with often humorous or provocative counter-military messages including a soldier and an insurgent kissing. Like *dead-in-iraq*, *Velvet-Strike* garnered interest in the press and in some corners of the art world, but many players within the game's online community were upset with the intervention into their game. Rather than see *Velvet-Strike* as a challenge to the burgeoning post-9/11 militarized discourse, they saw it as an attack aimed directly at the game itself.

In *Virtual Jihadi* (2008), the Iraqi-born artist Wafaa Bilal modified the game *The Night of Bush Capturing*, an Al-Qaeda-made mod of the popular *Quest for Saddam*. [10] In the original *Quest*, players fight stereotypically mustachioed Iraqis with the ultimate goal of killing Saddam Hussein. The Al-Qaeda mod reverses the premise, making the goal to kill George W. Bush. For his intervention, Bilal placed an avatar of himself as a suicide bomber in Al Qaeda's mod of the game. The work drew controversy and the original exhibition at Rensselaer Polytechnic Institute in Troy, New York was shut down by the school's administrators. Those who opposed the exhibition saw Bilal's work as pro-terrorist project and failed to see it as nuanced attempt to create an alternative narrative through a hybrid of autobiographical details and the game's narrative. Bilal's stated goal was to investigate the inherent racism within Western media depictions of the Arab world and the conditions under which terrorist recruitment becomes an option. In general, Bilal's work has involved challenging Western modes of watching 21st-century war. Bilal's work involves modifying both skin and screen by implanting his body into technologically mediated environments and, conversely, implanting technologies (surgically) into his body: in *Domestic Tension* (2007) (aka "Shoot an Iraqi") Bilal created a web-based installation in which participants could login and shoot a remote-controlled paintball gun at him; *…and Counting* (2010), was a 24-hour tattoo project in which dots of visible and invisible (UV) inks on his back represented American and Iraqi dead respectively; and, most recently, in *3rdi* (2011), Bilal has constructed a cyborg experiment in which a camera that is surgically implanted in the back of his head, beams images to a museum in Doha, Qatar.

Each of these artists addresses the medial entanglements of the screenic by creating a glitch – an ephemeral moment of interference – that attempts to temporarily disrupt the accepted screen world and, in doing so, disrupt the ideology that underwrites it. By engaging video-game interfaces and interactions, surveillance technologies, robotics, mass media, internet cultures, and social networks, such art practices construct situations that fleetingly expose the screenic entanglement of bodies and media technologies within digitally mediated visual environments. The interventions are aimed less at the games themselves and more at the perceptive practices that structure the waging and witnessing of modern war. These interventions invite a critical dissonance that allows us to not only see the game, but more importantly to see ourselves gaming in the context of virtual war.

As Rita Raley has observed, such interventions are inherently temporary, ephemeral, and aleatory. "Tactical media," she says, "signifies the intervention and disruption of a dominant semiotic regime, the tem-

porary creation of a situation in which signs, messages, and narratives are set into play and critical thinking becomes possible." [11] They are tactical, not strategic, because their outcomes are uncontrollable and unpredictable. Their most elucidatory moments can arise out of accident and failure. They are rooted in contingency. They are timely, but they do not last; all that remains are secondary objects such as screenshots, videos, photographs, and bits of code. What, then, do these tactical media interventions accomplish? Are they part of real political change or just fleeting commentary? Are they a mode of resistance or a gesture toward resistance? What kind of action is cyber intervention?

For Laughs, For Lulz

In a recent *New Yorker* essay, titled "For Laughs," about the conceptual artist Francis Alÿs, Peter Schjeldahl writes, "Most artists are still what artists have always been: people who make things. But the past half century has seen an increase, in number and in prestige, of artists as conceptual performers: people who chiefly do things, whatever their auxiliary output of pictures and objects." [12] Of course, "making" and "doing" are not as mutually exclusive as Schjeldahl suggests here, but his distinction does point to two different kinds of art objects: for makers, the object, itself, is the work and for doers, the remaining objects are a record of the work, not the work itself. Artists such as DeLappe, Schleiner, and Bilal are, at the end of the day, like Alÿs, doers insofar as their work is more event than thing. The work is lost save for a trail of text, code, screenshots, and clips. This kind of "doing" is what gives tactical media art its temporary, ephemeral, and aleatory qualities – the qualities of laughter and mischief.

The themes that DeLappe, Schleiner, and Bilal tackle are often serious and somber – not "for laughs" – but the nature of their work is mischievous. They break the rules of the game and create little glitches in the screen world. At about the same time that Schjeldahl published "For Laughs," a network of hackers calling themselves Lulz Security, or LulzSec, carried out a series of short-lived, but highly publicized hacks that exploited and exposed security loopholes on several high-value sites including the U.S. Congress and the C.I.A. LulzSec portrayed themselves as a band of merry hacksters who, like Alÿs, did it "for the laughs," or in their case "for the lulz." Lulz – which is modified internet-speak for LOLs or "laughs out loud" – in addition to laughter, also connotes the perhaps more radical idea of "lulls," a break in the flow of things. If there is no way outside of the techno-military screen world, perhaps the lulls and lulz of tactical media intervention become a gesture of resistance that, though it cannot break the frame, does manage, for a moment, to crack the surface. Somewhere between Alÿs and LulzSec, the screenic interventions of artists like Delappe, Schleiner, and Bilal seek ways to penetrate the weaponized surface – to create lulls in its illusive continuity, to be the wilier, regenerative Prometheus in the face of the Gorgon's stare.

References and Notes:

1. Ellen Nakashima and Craig Whitlock, "Air Force's New Tool: 'We Can See Everything,'" *The Washington Post*, January 2, 2011.
2. Iraq Uploaded: The War Network TV Won't Show You," MTV News Documentary, MTV, July 21, 2006.
3. Mark Glaser, "Your Guide to Soldier Videos from Iraq," *PBS MediaShift*, August 1, 2006, http://www.pbs.org/mediashift/2006/08/your-guide-to-soldier-videos-from-iraq213.html (accessed January 15, 2010).
4. Wikileaks, "Collateral Murder," April 5, 2010 http://collateralmurder.com (accessed April 7, 2010).
5. Paul Virilio, *Desert Screen: War at the Speed of Light*, trans. Michael Degener (New York: Continuum, 2002), 111.
6. Matthew Fuller, *Media Ecologies: Materialist Energies in Art and Technoculture* (Cambridge, MA: MIT Press, 2005), x, 5.
7. Rita Raley, *Tactical Media* (Minneapolis, MS: University of Minnesota Press, 2009), 71.
8. Joseph DeLappe's Web Site, "dead-in-iraq," 2006, http://www.unr.edu/art/delappe/gaming/dead_in_iraq/dead_in_iraq%20jpegs.html (accessed January 10 (2011).
9. Velvet-Strike Web Site, opensorcery.net, http://www.opensorcery.net/velvet-strike/ (accessed January 15, 2011).
10. Wafaa Bilal's Web Site, "Virtual Jihadi," 2008, http://wafaabilal.com (accessed January 15, 2011).
11. Rita Raley, *Tactical Media* (Minneapolis, MS: University of Minnesota Press, 2009), 6.
12. Peter Schjeldahl, "For Laughs," *The New Yorker*, May 23, 2011.

INTERACTIVE TECHNOTEXTILES - THE HYBRID BETWEEN TEXTILES AND TECHNOLOGY

Bettina Schülke

Ultra Smart Textiles are the latest generation of Smart Textiles, which can sense, react and adopt themselves to environmental conditions or stimuli from mechanical, thermal, chemical, electrical or magnetic sources. Thus the participatory audience experience is significantly heightened, "pushing the boundaries", compared to models created with earlier technologies.

Introduction

Much has been discussed about Smart Fabrics lately. This rapidly growing field   offers a huge range of research opportunities and new areas for investigations. These materials with incorporated technological elements enable the fabrics to transform into interactive interfaces. While numerous research opportunities as well as innovative method development by artists are offered in this field, it has to be noted that the goal of research is towards a pragmatic outcome closely linked to industry. The artist in this specific field serves as a conduit for knowledge transfer. A significant amount of astonishing results are already generated. Nevertheless several questions remain unanswered and need further explorations.

While basic research in this specific area has already been undertaken for more then ten years, recent developments present novel technical possibilities that are beginning to redefine textiles as a unique multidisciplinary field of innovation. Novel technology combined with one of the oldest traditions, the production of textiles, facilitates astonishing results on many different levels. Several papers already discussed applications of wearable's and fashion technology. To a lesser degree artists were looking into new possibilities of using Smart Textile materials as interactive surfaces by including these materials in site-specific installations. While Intelligent Textiles are nowadays still more connected with fashion or wearable's, health, sport or military use, there are huge possibilities for an artistic approach connected to site specific and interactive works. In the gadget or fashion field the technological tools are often separated from the textile material, yet unique developments for embedded technology inside the fabric are already being investigated offering new potentials. Observations show very clearly that a lot of research is still needed. How can these materials be used to create meaningful representations? How can the sensory aspect be further developed? How can the practical use of Smart Fabrics be widely promoted beyond the fashion and sports industry? This paper will focus on how the use of Intelligent Fabrics can be integrated more effectively in artworks that explore artistic and technical opportunities to enable new aesthetic perspectives.

The Hybrid Between Textiles and Technology

At the beginning I would like to introduce and define a few basic terms. The first generation, which could only sense the environmental conditions or stimulus, was called Passive Smart Textiles. The second generation, Active Smart Textiles, has both actuators and sensors. The actuators act upon the detected signal either directly or from a central control unit. Active Smart Textiles are shape memory,

chameleonic, water-resistant, vapor permeable and absorbing (hydrophilic/non porous), heat storage, thermo regulated and heat evolving materials. Ultra Smart Textiles are the latest generation, which can sense, react and adopt themselves to environmental conditions or stimuli. A very Intelligent Textile essentially consists of a unit that works like the brain with cognition, reasoning and activating capacities.

The production of Ultra Smart Textiles became reality as a result of a propitious coming together of traditional textiles and scientific disciplines such as the science of materials, structural mechanics, sensor technology, advanced detection-technology processes, communication artificial intelligence or biology. Integrating technology into textiles goes far beyond then just attaching electronics or devices underneath the surface. It has to be distinct whether the technology is attached or imbedded to the textiles.

Possible technical solutions for combining electronics with textiles are:

- Attached
- Embedded
- Woven into the textile
- Integrated into fibers

It can be observed that there is a tendency technology and electronics especially in the area of fashion design, performance and gadgets still quite often is separated or hidden under the surface of the textile material, where in other fields like for example in medical, sport or industrial textiles, remarkable developments take place in material science itself. While in early forms of wearable's sensors or gadgets were embedded between layers of textiles, stitched or crudely fed through seams, they where often described as interactive but needed the wearer to trigger various interfaces manually. Meanwhile embedded fibers can be equipped with cameras, microphones, speakers or sensors, which consequently leads to an improvement of interactive solutions and new possibilities for intelligent garments. Major research in this field was investigated lately at MIT, (Massachusetts Institute of Technology), for military use. Cameras or microphones embedded into textiles cannot only store information on computer circuits; they can also transmit and receive data by an external signal. [1] Today this technology first developed for the US military finds its way to subtle surveillance or sporting applications. Electronic modules are becoming rapidly smaller, lighter and more flexible, which consequently provides a better adoption to fibers and the soft tactile textile material. Attributes like "smarter", "reactive", "stronger", "faster", lighter", characterize these sleek fibers and materials. Remarkable developments are currently taking place in the improvement and engineering of fibers and material science, like for examples in the area of nanotechnology, sustainability, conductive fibers, glass fibers, luminescent textiles or woven interfaces.

Traditionally textiles used to be a "dead material", once manufactured they did not change the visual appearance of the surface anymore. As Piila Saksela [2] points out, " whatever material you are confronted with, it is already dead- the flax has been cut, the lamb shorn and silkworm has offered up its silk. All these diverse materials need new life breathed into them, they need be recreated in a new form."

Through the integration of various novel applications, materials like conductive fibers, electronic elements and PCMs (Phase Change Materials) fabrics develop the capability to communicate with their surrounding. Additional integrated sensory technology enables textiles interactive qualities. While PCM´s, some printing techniques or advanced coatings are rather applied on the textiles surface, there shows a clear tendency for new solutions which are already integrated in the weaving process.

Besides material science advancement, technical solutions cover the wide- ranging field of textile manu-facturing applications. Digital Jacquard looms can translate digital data into woven surfaces. Ink-jet printing machines are able to transform digital information to large-scale formats printed on fabrics. Other digital machines allow for the developing of new processes for knitting and embroidery. Convert-ing technically or chemically enriched fibers into intelligent materials combined with improved manufac-turing applications push artists' and designers' ideas and their projects far beyond a traditionally use of textiles.

Developing an intelligent fabric mostly requires a team of professionals like textile engineers, re-searchers and technicians. Without support from a professional lab or institute it is nearly impossible to develop an Ultra Smart Textile. The artist's position moves towards the intersection between textile re-search, material science, the production of ideas and content, design, industry and the art scene. A criti-cal analysis of electrically enriched textiles shows clearly the complexity of the improvement of Intelli-gent Textiles. This might also be one of the reasons why these kinds of materials are still nowadays rather rarely used in artistic installations. A much wider field of application is linked towards industrial products. Textile companies realized that there is a big potential to collaborate with artists in the read-justment process of developing experimental applications for intelligent materials. Leading textile com-panies on the European market are aware that the production of Smart Textiles can help them to strengthen there position on the market compared to low prize productions from the Asian market. Still many investigations in this area are rather prototypes then commercial interesting products. Neverthe-less, companies are in the need to create unique and outstanding products and that's the fusion link to "unnecessary research". A playful and highly experimental approach of artistic projects can close the gap between a strictly commercial thinking and spectacular ideas and novel investigations.

Interactive Intelligent Textiles in Contemporary Art

It can be observed that an increasing amount of artists are integrating textiles in their art-works of late. While textile art frequently was coated with attributes like handicraft or decorative art, electronically enhanced or interactive intelligent fabrics generate fresh contents and aesthetics.

- Where are difficulties and challenges using Intelligent Textiles?
- What are the limitations?
- How can fibers react more interactively?
- What are future parameters of developments in this area?

While seeking for answers to these and other related questions, I would like to introduce some exam-ples of already developed projects in the following, keeping in mind it is outside the scope of this paper to discuss various projects in detail, consequently only a few examples will be mentioned:

The engagement and interaction with the viewer can take place on several levels. Equally multifaceted are the directions of applications which can range from physical bodily engagement, motion responsive environment to emotional sensing and sound till via environmental data transfer or visualization.

Zane Berzina, [3] an artist and researcher born in Lativa and based in London, created in her project called *"E-static Shadows"*, an artistic translation of electrostatics that manifests the potential of harvest-ing energy from immediate surroundings. In this technically highly advanced two-year research project she collaborated with an international team of electrical engineers and material scientists to link new

technologies and smart materials with more traditional textiles approaches. Berzina explains, "that the electronic textile acts as a static mirror responding to the usually invisible charges generated by people interacting with materials and making them visible. Equipped with LED lights, transistors and woven electronic circuits seamlessly integrated into the electronic structure, the installation is able to create transient shadows on the textile display in areas which detect a presence of electrostatic fields feeding on the changes created by viewers and objects." In addition, Berzina points out, "This installation simultaneously acts as a simple sonic instrument in response to the presence and intensity of charges and human proximity".

The Slow Furl Project, [4] a collaboration between Mette Ramsgard Thomsen and Karin Bech of the Center for Interactive Technology and Architecture in Copenhagen and the University of Brighton, combines textile technology with the emerging field of robotics. For this large-scale installation a custom-made soft textile skin was woven with conductive copper fibers. Robotic textile membranes   function as sensory materials that can be programmed to interact with the potential for movement. This installation creates a playful environment interacting in slow motion with the viewers once entering the space. A mechanical system triggered through the touch of two parts of fabrics, initiate the change of the structures surface and shape. This project aims to explore the notion of flow.

Ligorano/Reese Collaboration [5] have been perfecting during the past years a new media work they call *"Fiber Optic Tapestry"*. In their description, "future tapestries will take the form of woven maps to show the appearance and disappearance of information from around the world; woven portraits, and use the individual´s Internet reading and self-metrics to create a picture of them; and a disaster tapestry that overloads and ultimately fails". This textile-real-time animation is an abstract data visualization that continually updates as data changes. Information from Twitter and other data sources display color, light and pattern onto woven fiber optic panels using RGB LEDs. The computer controlled custom-made lightening system displays information on the fiber optic panels, which are woven on a handloom. These textiles created with contemporary communication materials and processes redefine the role of a tapestry. Ligorano and Reese explain, "In European culture medieval tapestries tell narratives and in the 21st century we find our stories threaded and networked throughout the web. The Fiber Optic Tapestry is an art form about networking, communication and society. It is like weaving information."

The TITV Greiz, a German based Institute for Special Textiles and Flexible Materials is one of Europe's leading textile research centers. Two of their current research projects are based on the integration of LED technology into textiles. The "TexoLED Project" [6] investigates the integration of stiff OLEDs in spacer warp knitting. OLEDs are organic light emitting diodes in which the emissive electroluminescent layer is a film of organic compounds, which emit light responses to an electric current. The advantage of this technology is the combination of organic LEDs with electronic circuits made of synthetic materials   that create fully flexible displays that are almost able to arbitrarily bend, fold or curl. The aim of this method is ether to print electric circuits on the back of the fabric or implement conductive threads in the weaving process. However, this process can turn fabrics into flexible displays.

From Fiber Art to Intelligent Textiles

What is commonly known as fiber art has a longstanding background in the history of art. In the late 1950´s and early 1960´s a new generation of artists started experimenting with a variety of new aesthetics combined with old textile techniques. One of the first mentioned electronically enhanced garments

as artistic expression dates back to 1956. The Japanese artist Atsuko Tanaka [7] created for her performances the "Electronic Dress". Flashing multicolored lights were embedded in textile. Many developments in this area have happened ever since then. Today numerous Intelligent Textiles are developed with integrated light sources like LEDs, luminescent fibers, light-wires or light-emitting fabrics woven with optic fiber.

Profitable applications might ask for different standards then artistic applications of intelligent textiles. But exactly through this synergy spectacular ideas might appear. They can be at the first glace useless for commercial interests, maybe even inefficient or just simple humorous, play-and joyful, but can turn out as the base for adopted further developments or generate new products.

In industrial production technical solutions need to fulfill certain requirements or standards, mostly in terms of international norms or production conditions. Contrary to the normal practices of industrial protocol, artistic projects do have much higher levels of freedom to experiment or create very unique and playful solutions specifically developed for a certain artwork. Nevertheless there are several companies or institutions that collaborate with artists and invest a huge amount of their budget for the research in these new areas. One of them is Philips Design Probes. [8] The program of this private research organization based in the Netherlands is dedicated to "far-future" research of combining textiles and wearable's with sensory intelligence. Sheer limitless applications of digital technology explore, extend and enhance the human body´s ability to sense. Though their program is rather connected with commercial interests, nevertheless novel investigations in terms of sensory intelligence are explored in this research center.

Textiles and Interactivity

Textiles provide certain qualities no other materials can offer. When it comes to design there are nearly no restrictions in terms of shape, size and scale. They easily can become an integrated part of the environment and can be applied in two or three dimensionality. An enormous flexibility characterizes this material. When working with layers, surfaces can interact and create more complex compositions with depth of field. They are light in weight and predestined for mobility and easy to transport. The play between color, brightness and matte-ness, surface, line and the texture of the threads enable a unique creation of structures and surfaces. A haptic or sensuousness appearance of textiles often evokes the desire of touch and feel. Consequently these attributes allow playful applications combined with interactive or smart solutions.

New frontiers of perception and interaction are created by current technology. The comprehensive spectrum of innovative spatial and interactive work reveals how technology is fundamentally changing the use of textiles in artistic projects. Touch, engagement, exploration and intervention are just a few attributes that describe main sources of inspiration characterizing interactive applications for intelligent textiles. Artists and media designers are increasingly creating objects that communicate and installations are brought to life with the help of responsive low-and high-tech technology. Compared to models created with earlier technologies the question arises how specifically the use of intelligent textiles can be more effectively integrated in interactive or site-specific artworks.

- How can the participatory audience's experience be significantly heightened?
- How can the support of artistic projects push the development of Smart Textiles further?

Conclusion

The enormous complexity of many of the multidisciplinary research projects in this area involves mostly a whole range of specialists and experts with varying backgrounds. Without proper funding or the support of institutions, labs or industrial companies, it still remains difficult for the individual artist to work in this field. However, it can be observed that already a whole range of exciting projects was recently realized. Critical analysis illustrate clearly that it has to be distinguished between a commercial use of intelligent textiles and an artistic approach. Nevertheless in this specific field, a multidisciplinary collaboration of various disciplines may prove indispensable. It has to be noted that the goal of research is towards a pragmatic outcome closely linked to industry. The artist in this specific field serves as a conduit for knowledge transfer. Artistic projects with intelligent fabrics do have the potential to push new investigations in this field far beyond there conventional limits.

References and Notes:

1. *Bradley Quinn, Textiles Future (New York-Oxford: Berg, 2010), 20.*
2. *Matthew Koumis, "Pia Saksela," in Art Textiles of the World (Winchester: Telos Art Publishing, 2004), 90.*
3. *Zane Berzina, "E-Static Shadows, 2009," Zane Berzina's personal Web Site, http://www.zaneberzina.com/e-staticshadowsproject.htm (accessed August 30, 2011).*
4. *Center for IT OG Architecture, "Slow Furl: A Research Project by CITA," CITA's official Web Site, June, 2008, http://cita.karch.dk/Menu/Projects/Behaving+Architectures/Slow+Furl+%282008%29 (accessed August 30, 2011).*
5. *N. Ligorano and M. Reese, "Fiber Optic Tapestry - 50 Different Minds," LigoranoReese.net, http://ligoranoreese.net/fiber-optic-tapestry (accessed August 30, 2011).*
6. *TITV Greiz´s official Web Site, "TexoLED – Textile Integrated and Textile- Based LEDs and OLEDs," 2010, http://www.titv-greiz.de/index.php?id=bmbf16sv3450&L=....edu.tw%2Fid.txt%0D%3F%3F%2Ferrors.php%3Ferror%3D (accessed August 30, 2011).*
7. *Sabine Seymour, Functional Aesthetics (Wien-New York: SpringerWienNewYork, 2010), 14.*
8. *Philips Design Probes´s official Web Site,"SKIN: Dresses, 2011," http://www.design.philips.com/probes/projects/dresses/index.page (accessed August 30, 2011).*

DESIGN OF AN INTERACTIVE CULTURAL HERITAGE EXPERIENCE: THE HISTORICAL ORCHESTRA

Ferhat Şen & Reha Dişçioğlu

In this paper, we describe the design and implementation of the Historical Orchestra Project, with an emphasis on digital technology. The project is a digital cultural heritage experience that combines art, computing and digital technology. The Historical Orchestra is an interactive installation that is aimed at creating an engaging museum experience by its interactive quality and designed for use with an ancient Turkish illustrated manuscript.

Fig 1. Historical Orchestra installation setup as shown in Media Lab Demoday, 2011, Copyright Ferhat Sen.
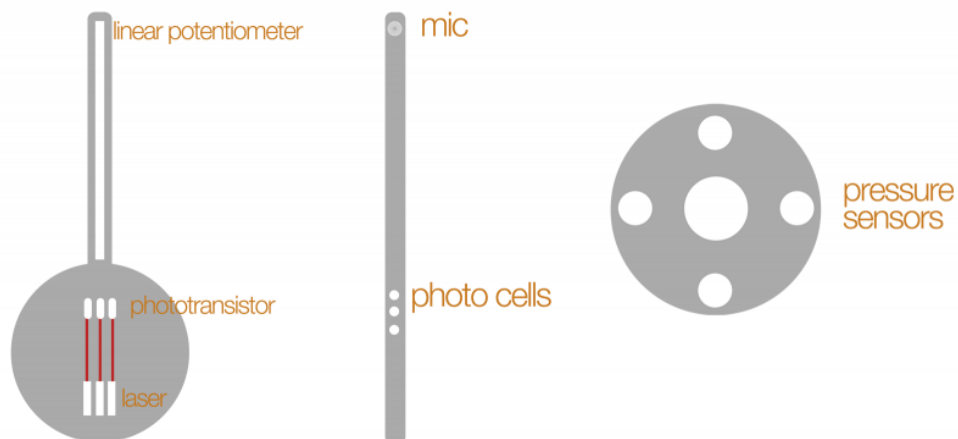
Fig 2. The Sensor Structure of the Digital Instrument, 2011, Copyright Ferhat Sen.

Introduction

The use of digital and electronic media implies a change in the conception of museums and the relationship between the artifacts and the visitors of the museum. In the traditional conception of museums, the artifacts are displayed in spaces under the necessary preservation conditions. Usually being behind glass protection, the artifacts cannot truly be sensed and observed by the visitors, neither by touch nor by looking closer. For example, some artifacts, like illustrated manuscripts, cannot be viewed completely since only one page of the book can be displayed at a time. Moreover, the information displays are often presented as a text next to the artifact, which is not offering an engaging experience. The lack of interactivity that results in the lack of visitor engagement is a major problem of this conception of museums.

In the context of cultural heritage, the use of digital and electronic media cultural heritage can provide new possibilities for visitors and heritage institutions to help them further appreciate the culturally valuable items in the collections. Digital media tools can enable us to create an interaction-based engaging experience through which the educational value can be conveyed. We argue that a multi-sensory experience inviting visitors to actively participate rather than passively see can contribute to conveying the educational value. An answer to the question of how to involve interactive media for an engaging and educational cultural heritage experience, we designed the Historical Orchestra Project by considering the specific qualities of the artifact in question. In this paper we present the design phases, from concept development to implementation, of an interactive audio/visual cultural heritage experience based on a page-couple from an illustrated manuscript.

THE ARTIFACT

Being a significant Turkish manuscript, Surname-i Hümayun (The Book of Imperial Celebration) was written and illustrated between 1583 and 1588 in Istanbul, Turkey. It is a documentation of a 52 day celebration organized by Sultan Murad III for the circumcision celebration of his son, Sehzade Mehmed, in 1582. The text is written in 16th century Turkish and uses Arabic script that follows a right to left layout. Similar to the text, the two-page illustrations also follow the right-to-left layout, where the illustration on the left page is the continuation of the one on the right page (Atasoy 1997, 32).

Comprised of 432 pages of text and 472 pages of illustration, the manuscript presents events and activities which took place during the celebration. In each illustration pair, a different group of artists and craftsmen are depicted in slightly different templates of the Hippodrome Square and Ibrahim Pasha Palace in Istanbul. Among these illustrations, we have selected the one illustrating the procession of musicians shown in Fig. 1.

THE INSTALLATION

The materials needed for the Historical Orchestra installation include one custom-made projection screens, and digital instruments. The selected illustration pair from the manuscript is projected onto two separate projection screens. The image is divided onto two screens in order to reflect the page structure of a book, since the original artifact is a book. In front of the screens, two desks are placed for putting the digital instruments on, and for hiding the irrelevant technological details from the visitors. On the

floor, in front of each instrument, a red circular rug is placed, designating where the visitor should stand. Two speakers are placed near the projection screens for the sonic feedback.

THE INTERACTION

When a visitor stands on the circular carpet in front of a tangible instrument, the system initializes and a corresponding animated musician appears on the screen. When the visitor begins playing the real instrument, the animation corresponds by appearing to play the same instrument on the screen, enacting a scene as on the original page of the manuscript artifact. In addition to the visual feedback, the visitor also receives sonic feedback when s/he plays an instrument. For example if a user plays the ney, s/he hears the sound of the ney playing the note s/he intended. The audience in the balcony and the Sultan on the top left are also interactive. The increase in the number of real players increases the audience in the scene. If there is only one user playing an instrument, a small audience appears on the balcony. When a second user joins, the audience increases on the balcony. After a third user joins, the audience on the ground floor as well as the sultan on the left-most balcony attends to see the performance of the musicians. When all users step off of the carpet, the musicians and the audience disappear.

Concept Development

HISTORICAL DRUMMER

Based on this selected artifact, the first concept was the Historical Drummer, which was an interactive installation that the visitor interacts with through a frame drum. The drum player in the illustration animates and starts to play a simple rhythm, and asks the user to accompany him. When the user starts to play, a human-sized cardboard puppet of the belly dancer in the illustration starts to dance to the beats of the drum created by the visitor. As the user continues to play the drum, other band members start playing to the song, and an audience appears on the projected walls of the installation space.

This concept was presented to two different audiences to see how it is received by different people. The first group was a culturally diverse audience, composed of ten masters degree level art and design students. The second was a group of six Turkish-origin masters and/or doctoral degree level students at different universities from around the world, from various backgrounds, and related to cultural issues. The received feedback showed certain common patterns as well as different point of views which helped us to re-conceptualize the project. Both audiences found it engaging and informative to a certain degree and offered suggestions for improving the interactivity. However, the method was not approved in the same way by the two groups. The first audience did not report any concerns about the perspective we had in the cultural context. Whereas, the second audience found the foundation that the concept was based on as not politically correct. The major criticism was regarding the selection of the dancer as the only interactive element in the installation. It is argued that the image of "dancer" is one of the most stereotypical elements in orientalism.

HISTORICAL ORCHESTRA

Taking into consideration the feedback we received, we decided to build an interdisciplinary team and re-design the concept. The previous design team, which was composed of designers only, was enhanced

with additional members who were also relevant to the project but through a broader range of perspectives. The final team comprised of an oud player, a frame drum player, a ney blower, and a Turkish literature researcher, along with interaction designers and a sound designer.

The resulting concept, the Historical Orchestra, is also an interactive installation based on the same artifact. Instead of one instrument and the real-sized cardboard dancer, it utilizes three tangible musical interfaces and gives real-time visual narrative feedback on screen. The sensor-based musical interfaces enable three users to play three instruments simultaneously. The visuals are based on the event depicted in the manuscript, i.e. the procession of the musicians. The illustration is interactively animated according to the actions of the visitor with the instruments (Şen and Díaz 2011).

Analysis of the Actual Instruments

The first step of the design process of the musical interface was the analysis of the actual instruments in terms of their affordance and intrinsic difficulties. Due to technical limitations, we selected three of the musicians and their instruments as the basis for the musical interfaces. The selected instruments are the Şehrud (Large Oud), the Ney (Reed Flute), and the Zilli Def (Tambourine) (Atasoy 1997, 13-17).

The Şehrud is a large form of the oud, which has been used in Turkish classical music and seen frequently in music-related scenes at illustrated manuscripts. It is a plucked string instrument with a fretless short neck and a round back. It has 5 string groups on the fret board where the player presses onto the string with his/her finger. The strings are plucked around the center of the round back with a plectrum.

The Ney (Reed Flute) is the major woodwind instrument used in Turkish classical music. It is made of a single piece of reed and has to have nine joints/segments that are ideally of equal length, regardless of the length of the ney. The length may vary according to the tuning. A ney has seven holes on it; six at the front for the fingers, one at the back for the thumb. The mouthpiece (başpare), which is located on the first joint is also known as the sound box of the ney, where the lips are placed and breath is blown. The ney is held by two hands in such a way that the fingers can cover the holes, and the upper end is supported by resting on the lips The ney is played by blowing into the mouthpiece at a certain angle with a trained lip placement which novices have hard times in even making sound.

The Zilli Def (Tambourine), a member of percussive instrument family, is a frame drum with cymbals located along the circumference of the frame. It is formed by a skin stretched over a circular frame. The diameter of the frame may vary from about 20 to 50 centimeters. The cymbals are placed in pairs to produce a sound at each tap of the Zilli Def, and four to five pairs of cymbals are used. It is a relatively intuitive act to make music with this instrument; however, creating a rhythm that is within the context of this illustration requires some knowledge which again impossible for novice users to have.

Sensor Structure and Mapping Strategies of the Digital Instruments

Like the acoustic version, the Digital Oud is formed with a neck and a round back having three laser strings, and a fret-board based on a linear potentiometer. On the round back, three low-power, approximately 0.45 mW, lasers are aligned in such a way that each laser points at a photo-transistor (Sparkfun Official Website, 2005). The laser/photo-transistor couple serves as an on/off switch representing the

gesture of a string pluck on the actual instrument. When a user touches the laser, the photo-transistor detects it due to the change in light striking on the sensor. On the neck is placed the touch-based linear potentiometer, which is used to detect the position of the user's finger on the fret-board as shown in fig. 2.

Various mapping strategies are employed for the sensor data coming from the photo-transistor and the linear potentiometer. The data coming from the photo-transistor is either 1 or 0, denoting whether the string is plucked or not. Each photo-transistor is mapped to a different octave in the scale serving as an octave selector. The data received from the linear potentiometer changes between the range of 0 and 1, depending on where the user's finger is. The length of the potentiometer is quantized into ten segments, where each segment represents a base note. Based on this note and on the octave selector, three harmonic notes are generated and played in random times with different random seeds.

Although the Digital Ney looks like the original ney, it is in fact a reduced version with a mouthpiece and only three holes corresponding to three notes. Under each hole, a photo-resistor is embedded to detect the openness of a hole. A microphone is placed into the inner part of the mouthpiece to receive the sound data when user blows.

The digital ney requires a real-time signal processing before the mapping could be done. In order to differentiate a blow from speech, the audio signal received from the microphone has to be processed. Using a bandpass filter (bp~), which passes certain frequencies and attenuates the others, we managed to filter out only the frequencies corresponding to a human blow. This enabled us to use the visitor's blow as the trigger to play the note. The note plays as long as the visitor blows. After being able to separate the blow, we also measured the amplitude of the signal and mapped the amplitude to the volume out of the instrument. In other words, the more powerful the blow is, the higher the volume of the note is. In order not to complicate the instrument, the digital version has only three holes and corresponding three notes. Each of the three holes is mapped to one corresponding note on the real instrument.

The Digital Tambourine has a circular frame and a drum skin over it. Five pressure sensors are placed under the drum skin to receive the input of where the user hits. The hit data from the user input triggers the drum samples. Each pressure sensor triggers different drum samples enabling the visitors to create rhythm by using basic rhythmic structures of Turkish classical music.

The Design Environment

The design environment has two main components: hardware and software. A Macintosh computer with a Mac OS X operating system, various sensors, and Arduino microcontrollers are used as hardware. Arduino, an open-source programmable microcontroller, enabled us to send sensor data to the computer via a USB input/output interface (Arduino 2011).

The software that we used for programming the real-time interaction, signal processing, and playing music is Pure Data (PD), which is a real-time graphical programming environment for audio, video, and graphical processing (Pure Data 2011). An external library called FluidSynth, which is a real-time software synthesizer based on the SoundFont technology, is used to generate the sounds of the instruments. The software that makes the real-time animation possible is Animata, which is a real-time animation software, designed to create interactive cut-out animations (Animata 2011).

Communication from hardware to software took place with Arduino through the USB interface. In order to read and transfer the sensor data from Arduino to a PD environment, communication was necessary between the sensor data and PD. First, an open-source firmware, Firmata, is installed to an Arduino microcontroller thus creating the necessary set of subroutines to use. Then, an open-source PD patch, Pduino, enables the PD to control all features of Arduino with Firmata firmware, including reading the sensor data.

In addition to the communication between the hardware and the software, software-to-software communication was also necessary. The communication line between PD environment and Animata software was the Open Sound Control (OSC) messaging. OSC is a protocol for communication among computers, sound synthesizers, and other multimedia devices.

Conclusion

In this paper we have presented a case study for creating an interaction-based engaging experience as a supplement to a cultural heritage artifact for enhancing the museum visit. By starting with a historical artifact, a 16th century Turkish illustrated manuscript, our case study is an interactive audio/visual installation utilizing three digital musical instruments and giving audiovisual narrative feedback in the form of interactive animation and sound. The actual instruments that are depicted in the illustration were a blueprint in designing the digital instruments. We argue that the experience emanating from the interaction of the visitors with the digital application contributes significantly to the dissemination of the educational value. This study shows how a museum visit can be enhanced by using interactive experiences considering the specific qualities of the artifact in question.

References and Notes:

1. *Nurhan Atasoy, 1582 Surname-i Hümayun: Düğün Kitabı (Istanbul: Koç Kültür, 1997).*
2. *Ferhat Şen and Lily Diaz, "Historical Orchestra: An Interactive Audio/visual Cultural Experience," in Proceedings of the International Conference "Re-thinking Technology in Museums 2011: Emerging Experiences eds. L.Ciolfi, K. Scott and S. Barbieri (Ireland, University of Limerick, 2011).*
3. *Sparkfun Official Website, "Spesicifactions", May 30, 2005,http://www.sparkfun.com/datasheets/Components/Laser-Card.pdf (accessed September 10, 2011).*
4. *Arduino's official website, http://www.arduino.cc/ (accessed September 10, 2011).*
5. *Puredata's official Wiki Site, "bp~, " http://wiki.puredata.info/en/bp~ (accessed September 10, 2011).*
6. *PureData's official Web Site, http://puredata.info/ (accessed September 10, 2011).*
7. *Animata's official Web Site, http://animata.kibu.hu/ (accessed September 10, 2011).*
8. *Open Sound Control's official Web Site "Introduction to OSC," http://opensoundcontrol.org/introduction-osc (accessed September 10, 2011)*

ART<>SCIENCE: AN ONTOLOGY

Timothy J. Senior & Florian Wiencek

With an increasing diversity in how traditional artistic and scientific practices are being brought together to generate new forms of expression and/or inquiry, the question of how to characterize such cross-over work is raised. To address this, we are developing an ontology and a process model that take into account the nature of project work, the processes by which they are created and the reception contexts through which they are disseminated.

Historically, notions of art and science have fluctuated in the degree of their [in]compatibility. With the re-emergence of art as a tool through which knowledge drawn from the biological sciences is being explored, unexpected relationships between traditional scientific and artistic practices are beginning to materialize. Beyond the incorporation of scientific imagery into works of art, the increasing commercialization of biological-research technologies now gives artists access to new methods and materials in their pursuit of artistic form and expression. [1] From transgenic chimeras to 'semi-living' constructions, artists are producing works that transcend the boundaries of these two cultures of inquiry; their works are scientific in formulation but express ideas and beliefs that extend far beyond the realms of scientific inquiry and interpretation. Scientific work, also, is open to cross-disciplinary influences in the adoption of artistic methods to frame and present scientific data and in the selection and rendering of research-derived imagery for gallery contexts. The notion of the 'performative' in science as a methodological tool for exploring behavior in simulated biological and mathematical systems also represents a striking new direction in this regard, [2] suggestive of a more mutually symbiotic relationship in which user interaction has simultaneous artistic and scientific merit.

With the crossing of boundaries at the levels of conception, methodology, publication and reception, the body of such 'cross-over' projects within the arts and sciences is becoming increasingly diverse. Towards generating a better understanding of how the interaction between artistic and scientific practices is shaping the creation of these projects we are currently adopting an ontological and process modeling approach. Through an ontological framework, i.e., a systematic account of a domain of discourse through the explicit description of its objects and the describable relations amongst them, [3] we aim to generate a formal representational vocabulary that bridges these two traditions of practice allowing us to model knowledge in the domain of art-science cross-over work. By combining this systematic account of these projects with a process model outlining the key stages of production, a much richer account of this knowledge domain can be created.

Our combined system is being developed from the perspective that all projects, whether cross-over in nature or more traditionally situated within a practice, constitute a form of inquiry through which new meaning can be derived from the queried subject. By approaching the description of processes underlying project creation in more fundamental terms of action types in relation to entities, i.e., through perspectives that are independent of the traditions in which they are used, a common framework for describing and comparing project types can be generated. By describing action types that are either common or exclusive to traditional artistic and scientific practices in these terms, a clearer picture of how

cross-over works navigate between different practices as a function of the creation process can be attained. Indeed, by categorizing projects not as single entities but as multi-faceted products of processual activities, a more nuanced description of projects is possible. The rest of this paper will be dedicated to briefly outlining our conception of this ontological framework and process model.

The ontology component of our work will build upon V2_'s Capturing Unstable Media Conceptual Model (CMCM), [4] designed to accommodate the documentation of electronic art projects in which a project is more broadly defined as "the entire, distinct process of a well-defined activity," [5] such as a scientific research project or artistic project, and its well-defined and distinct temporal outcomes as would be shown, for example, in an exhibition or publication. We consider V2_'s view on the nature of projects, and their mode of documentation, as highly suitable for the basis of our current work. With its flexibility in accommodating multiple authors, different project-formats and mediating between the influence of diverse artistic and technological practices, it serves well the cross-over projects that we address here. We are currently broadening the scope of this ontology to better accommodate projects of more traditional artistic or scientific origin, thereby supporting comparisons between project types. In addition, we are adapting CMCM to work with Basic Formal Ontology (BFO), [6] an upper-level ontology framework that more rigorously distinguishes between entities that continue or persist through time (termed 'continuants') and the events or processes in which they participate (termed 'occurrents'). This framework permits us to further categorize processes both in terms of their real-world components and their practice-independent, operational character, such as the degree to which they are input specific, reproducible and algorithmic in nature.

The process model component of our work defines the key stages in the creation of a project from conception through to project outcome, constituting a standardized framework across projects within which the ontology is organized and expressed. The model is envisioned as a series of key processing stages bridged by entities serving input and/or output roles. The starting point of the model is an instance of, for example, a material or digital entity, termed the 'Source'. The first stage, termed 'Handling' receives this entity as input and denotes those processes required to make explicit (i.e. perceivable) Source characteristics that are to be communicated through the project outcome. This may involve a re-contextualization of the Source or a more interventionist strategy in which the Source is itself altered. The output of this stage, the 'Handled Entity' is in turn the input for the second processing stage termed 'Capture', in which this entity is translated into a form that can directly participate in a project outcome, the 'Captured Entity'. Again we differentiate between context-level translation, in which the explicit form itself is re-contextualized as the Captured Entity, and form-level translation in which a change in its material nature occurs. The final processing stage, termed 'Dissemination', denotes the preparation of the Captured Entity for a specific dissemination form, the 'Disseminated Entity'. This final entity will have a reception context that reflects particular aspects of the full process through which it was created, a context that is also outlined via the ontology. Note that the multiple rounds of the process model are permitted in which either the Captured or Disseminated Entity can serve as Source, thus recognizing that in cross-over work materials may be engaged that originated in other projects.

As a simple illustration of some of these key terms, consider their application to a project utilizing a DNA sequencing methodology. The project would concern the sequence of nucleotides constituting a DNA molecule in a cell sample (Source); the actions required to prepare, operate and visualize the DNA sequencing reactions (Handling), producing an experimental outcome (Handled Entity); the use of digital photography and image-treatment methods (Capture) to make a record (Captured Entity) of the Handled Entity; finally, the actions undertaken in Dissemination to present that record as a Disseminated

Entity in a scientific or artistic reception context, an example of the latter being Gary Schneider's 'Genetic Self-Portrait' of 1997–8. A scientific reception context may constitute a peer-reviewed journal with detailed descriptions of key methodologies performed in the creation of the Disseminated Entity. A gallery context, in its contrasting approach to dissemination, will promote different types of engagement with the entity. It is a more systematic and detailed account of these differences in reception context that we hope to capture in our work.

Summary

In summary we are developing an ontology and a process model to address the domain of art/science cross-over projects, taking into account the nature of project work, the processes by which they arise and the contexts in which they are interpreted. In doing so, we hope to give an account of these works that may aid both the creation of innovative art projects and promote new ways of communicating and exploring knowledge from the biological sciences.

References and Notes:

1. *Jens Hauser, "Forward/Backward – Living/Still," SymbioticA's Web Site, 2007, http://www. stillliving.symbiotica.uwa.edu.au/pages/exhibition.htm (accessed July 5, 2011).*
2. *Hans H. Diebner, Performative Science and Beyond: Involving the Process in Research (Wien: Springer-Verlag, 2006), 20–35.*
3. *Ling Liu and M. Tamer Özsu, eds., "Ontology," in Encyclopedia of Database Systems (New York : Springer-Verlag, 2009).*
4. *Sandra Fauconnier and Rens Frommé, "Deliverable 1.2 Documentation and Capturing Methods for Unstable Media Arts," V2_'s Web Site, 2003, http://archive.v2.nl/v2_archive/projects/ capturing/1_2_capturing.pdf (accessed April 4, 2011).*
5. *Ibid.*
6. *Andrew D. Spear, "Ontology for the Twenty First Century: An Introduction with Recommendations," IFOMIS' Web Site, 2006, http://www.ifomis.org/bfo/documents/manual.pdf (accessed August 31, 2011).*

I, ROBOT: RETHINKING JACK BURNHAM'S SYSTEMS ESTHETICS

Margaret Seymour

In the 1960's and 70's, American art critic Jack Burnham shifted the emphasis away from artefacts – fixed, static objects - and towards the idea of networks and systems. This paper examines Burnham's 'systems esthetics' and tests his ideas against recent 'robotic' works by four Australian artists. Not all of these artists use cutting edge technology but each artist seeks to do more than simply imitate life.

What if you could bring a sculpture to life? The story of a sculpture that comes to life is one of western culture's oldest myths. From Ovid's Pygmalion to the making of the Golem from clay in Jewish folklore, the creation of life from inanimate matter has been a persistent fantasy. However since 1948 and the publishing of Norbert Wiener's book *Cybernetics: or control and communication in the animal and the machine,* [1] there has been strong interest in artificial life processes. One approach focuses on developing intelligent machines – machines that can regulate their own behaviour and more recently, 'learn' new behaviours.

Artists have taken a critical interest in interactive and intelligent machines. Early work in this area was promoted in exhibitions like *Cybernetic Serendipity* at the Institute of Contemporary Art, London in 1968 and in Jack Burnham's book *Beyond modern sculpture: the effects of science and technology on the sculpture of this century.* [2] Jack Burnham was an American artist, art historian and art critic. He was initially drawn to vitalistic art – for example the works of Henry Moore, Constantin Brancusi and Jean Arp – but by 1968 when he published his book *Beyond modern sculpture*, Burnham was championing a new type of art, one that would combine "machines with the qualities of living matter." [3] Tracing the development from what he saw as early proto-automata though to kinetic and robotic art of the 1960s, Burnham agues that the machine is the future of art and of sculpture in particular. For Burnham, cybernetics provides the key to this future. He describes Norbert Wiener's book on cybernetics as "the scientific inception of a dream which had haunted the makers of automata all through the ages – that of creating mechanical analogues to the nervous systems of animals, and through this gradually effecting some level of intelligence in the machine." [4]

Burnham was one of the first to acknowledge this new direction in art. He described sculptors in the 60's moving away from making artefacts – fixed, static objects – and instead building 'systems'. These systems were not simple repeated cycles, but were altered according to feedback loops through which the system becomes self-regulating. Moving beyond a formalist critique of machine aesthetics, Burnham helped establish the foundations for future research at the intersection of art and science. However his insistence on the mimetic nature of art is based on very traditional notions. In *Beyond modern sculpture* Burnham argues that sculptors in the past had to content themselves with life-like but static representations of human or animal figures. In contrast Burnham sees technology as heralding a critical transition for the whole of the human species – substituting organic life with sophisticated forms of synthetic life. He believes art has a key role to play in this transition. In doing so he places art in the service of technology, giving sculpture a new goal – that of creating a blueprint for "our destination as a post-human species." [5] In this paper I examine the work of four contemporary Australian artists to see in what ways they either adopt or challenge Burnham's thesis about the necessary goal of art.

Mari Velonaki's interactive work *Fish-Bird Circle B – Movement C* was made collaboratively with scientists David Rye, Steve Scheding and Steven Williams at the Australian Centre for Field Robotics, University of Sydney. The work was inspired by the story of a fish and a bird that fall in love but are unable to get together because of their differences. *Fish-Bird* consists of two computer-controlled custom-made wheelchairs, which are programmed to respond in complex and subtle ways to each other and to viewers. The wheelchairs navigate the exhibition space and periodically produce written messages thereby simulating dialogic exchange between each other and between human and machine. The first prototype of *Fish-Bird* was presented at Ars Electronica in 2004 as part of the *Unnatural Selection – Australian Media Art* exhibition. At this stage the motion control of the wheelchairs was relatively simple. As the project progressed detailed motion tracking and more refined behaviours were added.

I saw *Fish-Bird* in 2008 at the Campbelltown Arts Centre where it was exhibited as part of the *Mirror States* exhibition curated by Kathy Cleland and Lizzie Muller. By this stage complex behavioural patterns linked to the seven days of the week had been added along with "artificial 'emotional' states that describe how each robot 'feels' about itself, about the other robot, and about the participants in the installation space." [6] I had traveled to Campbelltown to take part in a symposium held in conjunction with the exhibition. In a quiet moment between sessions I ventured over to the *Fish-Bird* installation. The space was empty apart from two wheelchairs located in the centre of the room. The floor was littered with small pieces of paper. As I entered the space the wheelchairs separated, each moving to an opposite corner of the room. I stood still. After a few minutes one of the wheelchairs moved toward me and ejected a printed message that dropped at my feet. 'Deconstruct any notion of central consciousness', it read.

Fish-Bird, with its 'emotional states' assigned to each wheelchair, takes concepts associated with human behaviour and applies them to machines. This translation of concepts from one field to another also works in reverse. Just as machines of the past provided metaphors for understanding the human body and human subjectivity (think of Leonardo Da Vinci's cross-sections and exploded diagrams of the human body and their analogous relation to mechanical inventions of his time), computers are changing the way we think about ourselves. The language of cybernetics for example has provided new ways of thinking about human action, interaction and subjectivity. Concepts like 'feedback' have gained ubiquity. Interaction is now seen to be everywhere. The idea of feedback has shifted attention away from individualism, which highlighted a non-circular cause and effect way of understanding things. Instead of imagining that we exist independently of others and independently of chance events occurring in the environment, we now think in terms of networks, systems and programs. While some people feel this undermines our humanity, others like Donna Haraway see great promise in rethinking our relationship with machines.

Machines today are very different from the hulking monsters of the industrial age. Our laptops computers and mobile phones are portable user-friendly devices. Donna Haraway describes them as being "made of sunshine …all light and clean because they are nothing but signals, electromagnetic waves, a section of a spectrum." [7] Because we are intimately enmeshed with our machines Haraway argues that today we are all cyborgs, "theorized and fabricated hybrids of machines and organisms." [8] If we agree with Haraway, this is not a bad thing. The cyborg, part machine/part organism opens up the question of how bodies are formed in particular historical situations. The body is not seen as 'natural' but rather as simultaneously symbolically, biologically and socially produced. Velonaki's work, like Haraway's cyborg, encourages us to question some of the binary oppositions –human/machine, intelligent/programmed – that have traditionally structured ideas of the self in western societies.

In contrast to the technical sophistication of Velonaki's *Fish-Bird*, Simon Yates' artworks are lo-tech, hand-made replicas of outmoded or improbable machines. He has created walking sculptural figures, which are constructed with a lightweight armature and covered with tissue paper. Suspended beneath helium balloons, these motorized figures take small steps to propel themselves around the room. In a work entitled *Rhabdomancy,* which was exhibited in the *New09* exhibition at the Australian Centre for Contemporary Art in Melbourne, Yates created life-size versions of himself and writer Vanessa Berry. Unlike Velonaki's custom-built wheelchairs, Yates' work has a DIY aesthetic. His figures are carefully put together using simple materials. Again, contrasting with the complex range of responses evident in Velonaki's *Fish-Bird*, Yates' motorized figures are decidedly unresponsive. Oblivious to each other and to curious spectators they instead seem completely absorbed in the task at hand – staying upright and moving slowly forward. A more recent work by Yates, modelled on the robot Maria from Fritz Lang's 1927 film *Metropolis,* was shown in the exhibition *Awfully Wonderful: Science Fiction in Contemporary Art.* Curated by Bec Dean and Lizzie Muller for Performance Space, the exhibition was presented in the foyer of Carriageworks, an art centre housed in the old Eveleigh Rail Yards in Sydney. The papery fragility of *Metropolis Robot (Futura),* which was buoyed up beneath gold helium balloons, lent the figure a spectral aspect. It seemed as if the ghost of the robot Maria had returned to walk the cavernous halls of the building, itself a repurposed industrial site with many of its original features still intact.

Yates' work might at first glance appear to be the antithesis of *Fish-Bird*. His low-tech robots are vastly different from Velonaki's cutting edge computer programmed wheelchairs. The figurative form of Yates' work also contrasts with Velonaki's nonfigurative approach, which instead suggests the absence of the body. While the physical components of Yates' work are very simple – helium balloons support the weight of the robot while a small motor operating a cam causes first one leg and the other to step forward – both Velonaki's and Yates' robots evoke a sense of wonder. In Yates' work this is partly because of the fragility of the robots. Everything is in perfect balance. Should one element fail, the walking robot's progress would cease. In *Rhabdomancy,* Yates has created body doubles or avatars of himself and Vanessa Berry that occupy real space. Unlike static sculptural portraits that fix a likeness for all time, Yates highlights his robots' frailty.

Wade Marynowsky has, in a different sense than Yates, also made avatars – physical avatars he can inhabit. In his work *The Discreet Charm Of The Bourgeoisie Robot*, exhibited at The Institute of Contemporary Art Newtown (ICAN) in 2008, Marynowsky presented a robot wearing a hoop skirt and topped with a perspex dome 'head'. Recalling the automatons of the 18th and 19th centuries as well as the science fiction robots called daleks from the well-known TV series *Dr Who*, Marynowsky's 'bourgeoisie robot' is operated telematically over the internet. Marynowsky says of this work, the "charming robot avatar waits for visitors to enter the space and then converses with them in a polite and pleasant manner." [9] Dressed in a black tunic with a white lace collar, the robot seemed friendly and eager to please. Without the dalek-like head and the speed with which it could spin on its axis to track an unsuspecting viewer, the robot might have appeared benign. However an uncomfortable feeling persisted. With the battle cry 'EXTERMINATE!!!' would it suddenly reveal more sinister motives?

Marynowsky's more recent work *The Hosts: A Masquerade of Improvising Automatons,* exhibited at Performance Space in Sydney in 2009, comprises five robots dressed in elaborate costumes. Each robot represents a different character or personality – for example 'the cowgirl' and 'the princess'. Together they roam around like guests at a masquerade ball and periodically emit strange vocalizations or spin giddily on one spot. Taking on board Japanese roboticist Masahiro Mori's theory of the uncanny valley (1970), that if robots are too life-like they cause us to recoil, Marynowsky doesn't aim for human likeness. Like his earlier 'bourgeoisie robot', each 'host' wears a hoop skirt which provides space for, but also hides,

the mechanical and electronic components. Each robot is also crowned with a dalek-like domed head from which shines a beam of light or alternatively two bright blue or red 'eyes'.

Implied in the sub-title, the theme of the masquerade or disguise is central to this work. Marynowsky is interested in the point at which one thing flips over to become the opposite – an uncanny moment when the familiar becomes strange. *The Hosts* perform this crossing over on many levels. They are at the same time a figure and a machine as well as male and female – Marynowsky describes them as trans-gendered. The robots are also 'hosts' in more ways than one – as organizers of the party perhaps but also because they harbor another entity or parasite in the form of the computer program or programmer.

While Marynowsky has given each of his robots an individual 'character' which is expressed in their costume, he deliberately avoids using realistic human forms. Instead he humorously gives us a double serving of mimicry. Marynowsky's robots are daleks cross-dressing as 18th century automata – machines that mimic other earlier machines made to mimic humans. This self-reflexive aspect of Marynowsky's work playfully mocks the Faustian goal Burnham assigns to artists. Instead Marynowsky is interested in society's fascination with robots and our ambivalent responses to them.

My own work *Angelica* (2008) is hardly a robot. *Angelica* does not have any moving mechanical parts or feedback systems. Instead it is a three-dimensional work that resembles a modified factory chair. Two LCD screen are incorporated into the metal frame of the chair. One screen replaces the seat of the chair and the other becomes the backrest. Two moving images are displayed on the screens. One shows the exterior of the body and the other is an MRI scan showing the body's interior. The images on the screens are in a constant state of transformation. A fluid line sweeps across the surface – peeling back the exterior of the body to reveal the interior. The transition resembles a digital wipe. However instead of being created on the computer, the effect was made by casting a shadow over two projected images and filming the result. The back and forth motion of the shadow is similar to the movement of a scanner converting analogue into digital information.

I made the work after spending time in hospital where I underwent a series of tests.Hooked up to various diagnostic machines I was reminded of Donna Haraway's comment that today "machines are disturbingly lively, and we ourselves frighteningly inert. [10] The machines beeped and crackled as they probed and scanned. In contrast I had to lie still and wait for the results. When I was discharged I was given copies of the scan images. To me they appeared strangely robotic. It was as if the scanner had transformed my body into another machine – one with distinct muscle groups which when rendered in black and white took on the metallic sheen of a robot.

In *Angelica* I am interested in the shift from analogue to machine vision and also in cultural representations of women and technology, particularly in science fiction films. These films often reveal a deep-seated anxiety associated with robots which is played out in narratives of mastery and slavery. For example, Fritz Lang's 1927 film *Metropolis* [11] presents a dystopian vision of the future where technology has enslaved the workers. Women, represented by the real and false Marias, are depicted as either angels or whores. Embodied in the figure of the false Maria, who when captured and burnt at the stake resumes her robot form, both women and technology are represented as a threat to life. The message is that, like women, technology may be seductive but it is also out-of-control.

Ridley Scott's 1982 film *Blade Runner* [12] presents a much more nuanced investigation of the relationship between the human and the non-human. Rather than *Metropolis*' tale of good versus evil, the narrative in *Blade Runner* turns around the theme of doubt – how can you tell a replicant from a human when each has memories? When the replicant Rachel asks Deckard if he has ever taken the Voight-Kampff empathy test she throws the question back onto him – how does he know that he isn't also a replicant? The ontological doubt arising from the increasingly blurred boundary between human and machine marks the distance travelled between representations of robots in *Metropolis* and in *Blade Runner.*

Instead of Burnham's idea that artists are preparing a blueprint for a post-human species, blurring the boundaries between humans and machines might be a better way to understand the works of the artists I have discussed. This blurring is a two way street. While machines have become more intelligent there is also the possibility that humans might recognize they are not always masters of rationality. In his book *Tarrying with the Negative: Kant, Hegel, and the critique of ideology* cultural critic and theorist Slavoj Zizek poses the question 'Do computers think?' He argues that even though it is clear that the computer in some sense only simulates thought, yet "*how does the total simulation of thought differ from real thought?*" [13] Zizek's answer is to reverse the metaphor and instead of seeing the computer as a model of the human brain, to see the brain as a "computer made of flesh and blood." [14] By extension a robot is not an artificial man, rather man is a 'natural robot'. Writing from a Lacanian perspective, Zizek uses this reversed metaphor to underscore his ideas about the split subject, who can never fully know him or herself and for whom "*something must remain unthought.*" [15]

I have argued that contrary to Burnham's thesis, many artists do not aim to recreate life. Some explore our persistent fascination with machines while others perform a de-naturing of the body, showing that the boundaries between human and non-human are not clear-cut. The question is not whether our machines are alive but in what ways we, like our machines, are hybrid creatures - a blend of natural and artificial, intelligent and programmed. Seen from this perspective, robots remind us there is nothing essential about humans. Instead we are formed in particular historical and social contexts. Acknowledging this might as Haraway argues, give us the best chance of developing new forms of subjectivity, which conscious of our kinship with other animals and machines do not simply repeat patterns of domination and control.

References and Notes:

1. Norbert Wiener, Cybernetics: Or Control and Communication in the Animal and the Machine (Cambridge, MA: The MIT Press, 1961).
2. Jack Burnham, Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century (New York: G. Braziller, 1968).
3. Ibid., 314.
4. Ibid., 315.
5. Ibid., 371.
6. Centre for Social Robotics, "Fish-Bird: Background," Centre for Social Robotics' Web Site, http://www.csr.acfr.usyd.edu.au/projects/Fish-Bird/Background.htm (accessed June 5, 2012).
7. Donna Haraway, "A Cyborg Manifesto: Science, Technology and Socialist-Feminism in the Late Twentieth Century," in Simians, Cyborgs and Women: The Reinvention of Nature (New York: Routledge, 1991), 153.
8. Ibid., 150.
9. Wade Marynowsky, "The Discreet Charm Of The Bourgeoisie Robot," Wade Marynowsky's Web Site, http://www.marynowsky.net/bourgeoisie4.html (accessed June 5, 2012).
10. Donna Haraway, "A Cyborg Manifesto: Science, Technology and Socialist-Feminism in the Late Twentieth Century," in Simians, Cyborgs and Women: The Reinvention of Nature (New York: Routledge, 1991), 152.
11. Metropolis, dir. Fritz Lang (1927).
12. Blade Runner, dir. Ridley Scott, based on the novel "Do Androids Dream of Electric Sheep" by Philip K. Dick, screenplay by Hampton Fancher and David Peoples (1982).
13. Slavoj Zizek, Tarrying with the Negative: Kant, Hegel, and the Critique of Ideology (Duke University Press, 1993), 43.
14. Ibid.
15. Ibid., 44.

IMPROVING THE INFORMATION SOCIETY THROUGH AWARENESS OF LANGUAGES

Alan N. Shapiro

On a planetary scale, the quality of communication, work, cross-cultural empathy, scientific and business development, health care, and leisure-time experience in the information society has been limited by the way that English has been adapted as the global language.

On a planetary scale, the quality of communication, work, cross-cultural empathy, scientific and business development, health care, and leisure-time experience in the information society has been limited by the specific way in which English has been adapted as the global language. It is important to have at least one global language (Spanish and Mandarin Chinese are also candidates for this status), but it is also urgent that other languages be recognized and respected, and that the entire multi-lingual situation of the network society and the era of globalization be pragmatically treated with more awareness. The trend has been towards the unconscious creation of hybrids of English and a national language. We instead need to work towards restoring the separate autonomous integrity of both English and the national language. I will consider three areas, and present two empirical examples in each area. I will make concrete suggestions for improvements to the language situation in the context of case studies. First, in software development in the IT industry, in non-English speaking countries, the quality of communication among programmers and other IT experts has been affected by the reality of hybrid language situations. I will mention the examples of the software industry in Germany and Italy. Second, in museums, the same question of English-and-national-language duality with respect to the presentation of museum objects and artefacts (both to physically present and online-remote-virtual visitors) requires serious attention. I will discuss the examples of some prominent museums in Germany and Italy. Third, I will consider how communication in online social media like Facebook, Twitter, virtual world simulations, and chat rooms is affected by the global use of loosely structured English and netspeak. I will propose measures to upgrade social experience and interaction through the educational amelioration of the English in circulation, an expanded role for national and local languages, and an appreciation of the value of colloquialisms, slang, acronyms, emoticons, and other "digital culture" socio-linguistic practices.

Everyone on the planet who is not a native speaker of English is in some way disconnected from full participation in the information society. Even the top academic media and technology thinkers, who spend their days and nights informing themselves in real-time about all the latest developments in the online world, are faced with significant language obstacles in trying to disseminate their ideas – through books, articles, blogs, chats, facebook discussion threads - if their English is not at the level of native speakers. Should I go and live in Los Angeles, USA or Sydney, Australia for a few years to improve my English? Should I write in English with mistakes - or perhaps in my native German, Dutch, or Italian - and then have someone translate it? Or should I run it through Google Translate and then edit it? If these dilemmas are the case for digital citizens at the highest level of understanding, then just imagine how difficult the situation really is for "ordinary people" whose native language is not English. Or, to turn the observation around into a more positive formulation: imagine a future - a more advanced stage of the information society - where the reality of the world's many languages has been thought about and handled

in a more intelligent way. Imagine the economic and cultural productivity that will be unleashed when a more subtle system is put into place that enables everyone to express themselves.

Sociologists have given different names to the society that is the successor to the industrial society of the production of physical goods. This brave new world has been called the post-industrial society, the post-modern society, the knowledge society, the network society, the telematic society, the information society. The information society shifts the center of economic and cultural activity in late capitalism off-center to the handling of information. Beyond its restricted mathematical meaning, or its technical meaning as signs or signals in information science messaging, information more generally, in the sociology of work and culture, is about abstraction and complexity. Success in work-slash-business and in culture depends on the mastery of representation and communication. But a huge and crucial mistake has been made so far in our society-wide understanding of what information is. So far information has been conceived without any sensitivity to or appreciation of language and languages. Information has been regarded as being like numbers, an ordered sequence of symbols, bits and bytes of data, a change in state of an object-oriented system, transparent signifieds only, without the signifiers that shape the meanings, a bunch of facts on file, the transmission or contents of messages while ignoring the media – language itself – that structures the messages at the most intricate detailed level. Information has been recognized only in the British analytical-rationalist-empiricist-logical positivist way, as pure language-less thought in a networked brain of The Global Village, without reflection on language, and this has truly massive and limiting consequences. Consider the dialogue between Number Six and Number Two that opens each episode of the great 1960s British BBC television show *The Prisoner*, created, written, directed by, and starring Patrick McGoohan:

Number Six: Where am I?
Number Two: In The Village. (**Marshall McLuhan's Global Village**)

Number Six: What do you want?
Number Two: Information. (**The Information Society**)

Number Six: Which side are you on?
Number Two: That would be telling. We want information, information, information…

Number Six: You won't get it.
Number Two: By hook or by crook we will.

Number Six: Who are you?
Number Two: The new Number Two.

Number Six: Who is Number One?
Number Two: You are Number Six. (**alternatively: You are, Number Six**)

Number Six: I am not a number. I am a free man.
Number Two: Ha, ha, ha, ha, ha, ha, ha, ha….

I think that there should be three global languages: English, Spanish, and Chinese. This would be a strong basis for a more sophisticated system. Other regional and local languages should play important roles within their territories and for each individual person who chooses to express herself in a particular

idiom. Having only one global language (English) immediately establishes systemically a crude binary oppositional hierarchy between the haves and the have-nots, between the one global language which is above the bar of separation and all the regional and local languages which are below. Having three global languages (English, Spanish, and Chinese) - which are not themselves involved in a relationship of strict equality with each other - establishes the basis for a system of relationships which are, in their structure, beyond the binary oppositional structure of one term of the relationship being strictly above the other term. One of the global languages may be somewhat more important than a certain regional or local language, but there is a built-in limit to how much more important than the other it is. Having three languages instead of one at the apex of the language system of the global information society triggers a cascading effect throughout the system of the unfolding of more complex patterns and mutually reciprocal relations. The entire multi-lingual situation of the information society should be treated with more awareness. So far we are sleep-walking in unconsciousness with the imposition of English in a simplified rather than well-thought-through way. We need to restore the separate autonomous integrity of English, the national language, and a normalized hybrid vernacular.

The accelerated propagation of global digital technology and global media culture has brought with it the accelerated predominance of English. The result is a two-tiered system, with English as the master code. This system no longer entails a relationship of domination of one of the system's elements by the other. It is rather a relationship of virus-like infiltration by the stronger element of the weaker. Taking the situation of German as an example, there is an implosion stemming from the epidemic proliferation of English terms in the interior of the German language. When a German speaker talks in an advertisement, movie, TV program, or on the Internet, she sprinkles her utterances liberally with English words. When a German speaker talks about business management, computer software, digital technology, telecommunications, financial markets, fashion, music, sports, shopping, consumer objects, or "personalized" emotions (Ich habe ein Happy Feeling), she supplements her speech with substitute or designer words taken from English. English words are used in the German language in any domain where the speaker wishes to enhance the prestige of her discourse by holding up a sign of globalized professional, technical, or consumer knowledge. But since the word is outside its living English context, and is not integral to any German context, it is like a fish out of both waters in a hybrid language called Denglisch.

The first case study that I will consider while making concrete suggestions for improvements to the language situation of the information society is software development companies in the IT industry in non-English speaking countries. My two empirical examples will be the software industry in Germany and Italy. I have worked on many software development projects in Europe and the USA, and I have observed the quality of communication among programmers and other IT experts being affected by the reality of hybrid language situations. Currently, I am working on a language internationalization project in Germany, and I am seeking to expand this area into part of a business that I hope will grow into what I call a radical technology company. I call the business that I am in: humanities informatics or Computer Science 2.0. Our slogan is: "Upgrade Information Technology with real knowledge from the arts, sciences, and humanities."

One of the most important professional aspects of software development is documentation. Written documents support the design phase of a project, the analysis of the functional-business area, the conceptualization of the software architecture, the technical implementation, and the operation and maintenance of the running system after it goes live and into production. It is very important to the success of projects that the documents written by one programmer or technology expert be useable and understandable for the subsequent readers of the document. Otherwise, there is very little point in the document having been written at all. Programmers and people involved with computing in German-speaking

countries are very attracted by the English language, which is seen as being the "native language" of information technology. So they tend to write documents which are principally written in German, but which use a lot of conceptual and technical terms taken from English (sometimes applied incorrectly), including acronyms. The result is documents written in a mixed hybrid language which is not especially comprehensible to readers. I think that what we need to do is to restore a high-quality original German version of documents, and, in addition, have a high-quality English version, and then have a third version which is hybrid, but also work on some sort of codification and standardization of the hybrid language. Many young people in our society want to become doctors, lawyers, and computer engineers, but I believe that there is a lot of potential and very interesting work to be done in humanities informatics, such as in this language internationalization business area. Our goal is also to upgrade the language in which information technology is discussed to a qualitatively richer and more sophisticated language in the humanities sense.

Another language that I speak well is Italian. I have especially enjoyed reading great Italian novelists like Italo Svevo, Leonardo Sciascia, Italo Calvino, and Carlo Emilio Gadda in the original Italian, and even partly in local dialects. It is in some ways painful to imagine the beautiful Italian language getting corrupted by the infusion of English and hybrid IT terminology into its heart. At the University of Pisa, where computer science was first introduced to Italy in 1969, there is an academic programme in English-Italian translation studies, designed to train language specialists in professional domains like law, economics, IT, software localization, environment, energy, bio-medical and pharmaceutical industries, meeting the standards of the curriculum of the European Master's in Translation, as established by the Director General of Translations of the European Commission. But take a close look at the English-language Wikipedia article on the University of Pisa. It contains sentences whose relationship to English can only be described as accidental: "The Computer Science course at University of Pisa was the first one in the area to be activated in the whole Italy, during the 1960s." Activated? "After the second world war the University of Pisa returned to the avant-garde in many fields of knowledge." Which avant-garde would that be? The artistic avant-garde? The futurists? The dadaists and surrealists? The best in computer science and the best in translation studies together at the same university. Wow! But the Pisa University administration seems to be neither aware of the importance of Wikipedia in the information society nor of the English-language skills available to it within its own faculties.

I believe that the scope of the academic field of translation studies should be greatly expanded to include subjects and goals concerning language in the information society like those that I have discussed here. Italy has been suffering badly from the global financial and economic crisis which began in 2008. The computer industry has been hit particularly hard. An Italian vice-president of Microsoft recently stated that he believes that 40,000 jobs are in danger of being lost in the IT sector in Italy. Perhaps one way out of the crisis would be to start projects having to do with language awareness.

Museums are another area where the question of English-and-national-language duality with respect to the presentation of museum objects (both to physically present and online visitors) requires attention. I recently visited the Berlin Wall Museum and the Film and Television Museum in Berlin. At both of these museums, texts that accompany exhibitions are in both German and English. I noticed that the quality of the English-language texts is rather mediocre, with German-influenced sentence structure, mistakes in historical usage of terms, and difficult to comprehend phrases. Yet I have been told by several individuals that these museums would not be interested in spending more than a little money on getting these translations right. The original German texts may have problems as well (so it seemed to me); some of the difficulties in the English texts may be derived from ambivalencies in the German ones. I apologize for not having the time in these 20 minutes allotted to me to present specific examples. I need to revisit

those two Berlin museums and take detailed notes. At a famous art museum at the Piazza del Duomo in Milan I noticed similarly problematic English texts, although there seemed to be an inconsistent mixture of translations done by both native and non-native speakers of English.

As I reach the end of writing my own text – the paper serving as the basis for my talk at ISEA2011 in Istanbul on language and the information society – I realize that I will not have time to immediately keep my promise to discuss how communication in online social media is affected by the global use of loosely structured English and netspeak. I intend to keep this promise someday, but I will have to defer its fulfillment for now. I will say that I believe that the quality of online social experience and interaction could benefit from some real improvements in education in the schools in self-expression via language, and some real love for the English language and other languages. And what is the value of colloquialisms and slang? They are an important object of socio-linguistic inquiry. And what are we to make of all those acronyms and emoticons? LOL! Smile please!

References and Notes:

Alan N. Shapiro, Star Trek: Technologies of Disappearance (Berlin: AVINUS Press, 2004).

Gianna Maria Gatti, The Technological Herbarium (edited, translated from the Italian, and with a Preface by Alan N. Shapiro) (Berlin: AVINUS Press, 2010).

Jeffrey Gormley, ed., Framemakers: Choreography as an Aesthetics of Change (with 3 contributions by Alan N. Shapiro) (Limerick, Ireland: Daghdha Dance Publications, 2008).

NORTH, INTERRUPTED

Leslie Sharpe

"North, Interrupted" discusses artists' use of both online data and data or research materials gathered from place to create works related to the Canadian North, indicating specifc information related to climate change or human activity that impact the inhabitants and spaces of the North.

Figure 1. Polar Bear Space 1, Leslie Sharpe, 2009.

Figure 2. Proximities in Google Earth.

Figure 3. Oil, Caribou, Polar Bear layers in Google Earth.

North, Interrupted

I looked down at the lines from the window of a Twin Otter – etched onto the mountaintops cradling the Firth River I could see traces of caribou heading towards calving grounds –crisscrossing paths over places I could only see through a distant window.

I tried to find the lines later, on a close-up view in *Google Earth*. Longing to replicate the experience of flying between mountains where I could almost touch those paths, I hoped that I could zoom in closer, but I was lost in a mass of unmarked pixel-peaks, seemingly unexplored for those who wish to map it online.

In this view of *Google Earth*, Northern Yukon is a place dotted with minimal human experience and one can only imagine the existence of the animals and humans who move across that landscape. But those who build satellites seldom have the knowledge or needs of the North's inhabitants in mind, not unlike previous interlopers throughout history. (To wit: the 52 radar stations known as the 'DEW-line' built by the US Military during the Cold War in the Canadian Arctic were designed to protect Southerners from any Soviet missiles headed towards America, and then disassembled to leave only skeletons of unusable equipment and toxins for the locals to deal with.)

Any trace of animal or human existence and their northern experiences would have to be revealed by adding layers not evident in the satellite image, but added by the global web community (who may or may not be north).

I imported my own location – of my little tent in Ivvavik National Park, and when I imported layers related to the surrounding area, I found the other evidence I sought, in lines of animals moving through the Arctic as they are tracked via telemetry, made by radio-collared animals such as Polar Bears tracked by *World Wildlife Foundation* on *Google Earth*, or the Porcupine Caribou, whose movements in Canada and Alaska are tracked as they unknowingly disregard human political borders.

Animal lines of movement created through telemetry reveal passage and habitat of animals, and along with other data, make clear why climate change and human development in the north have an impact on things we may not see or understand from the south. These lines are a form of data that bring direct experiences such as movement or weather data into systems and knowledge that can be folded into the multiple crisscrossing lines and ideas of 'north.'

Along with my own real experiences of the Canadian Arctic and SubArctic, I have been following these lines, such as the lines made by Polar Bear 3 or by several Porcupine Caribou, then interpreting and utilizing this animal movement data in various ways where one aim is to strip some of the romantic and colonizing views of north —views prolonged by both outsiders and insiders. These lines have found their way into my images and installations, as well as instruction works for choreographed performance which will take place when the snow hits northern Alberta this winter.

Fig. 1. Polar Bear Space 1, Leslie Sharpe, 2009.

In some images for this work, I try to assert the habitat of the animal as a geopolitical space – a nation of sorts — so that the range of a single polar bear is a force that might itself be a contender in the latest

battle for Arctic sovereignty. One can imagine Sarah Palin looking out her window and 'seeing' this as a foreign force to contend with.

I have encountered real caribou in real places (e.g., Victoria Island, NU/NWT, Fogo Island), but I have known 'Iola' and other caribou longer through following their movements online. I have been following 'Iola' along with Arnaq, Lucky, Bertha and other radio-collared caribou, as well as polar bears to create artworks from their tracked movements, and to understand how those movements are affected by changes in the arctic. Occasionally the line of movement of a tracked caribou stops when the collared animal has stopped transmitting. When a radio-collared caribou disappears in this tracking system, we don't know whether the disappearance is evidence of battery breakdown – or evidence of their mortality. We only know they are no longer there as a virtual presence.

The mystery of their disappearance is fitting for the temporality, mutability, and disembodiment of online identities – the caribou is no longer transmitting, but she could reappear, and we begin to understand her as a series of dots, as movement, and her range as a data-line or subset of an intertwined virtual and real system of distanced awareness of North.

During an artist's residency in a remote area of the Canadian Yukon's Ivvavik National Park, I happened upon a chilling site while following an old placer mining trail. The site was a spot in the woods where a large blanket of caribou fur coated the earth. There were no bones in sight. The physical evidence made clear that this was a 'kill' site, where one caribou met a frenzied demise in a pack of wolves. I wondered about my online caribou 'friend' 'Lucky,' the online caribou who may not have been so lucky, and her eerie telemetric disappearance when the collar stopped transmitting. I wondered whether the brutality evident in the broad scattering of fur was similar to her last moments, or whether her collar battery had just stopped working. I hope Lucky's name was fitting. But through the discovery of that kill site in Ivvavik, Lucky and the other transmitting caribou were no longer merely avatars or samples of data for me. They were now linked my field data set— a real-world research system gathered through non-technological methods, such as gathering caribou hair, walking in their tracks, recording sounds, or casting animal scat.

While I was in Ivvavik, I also transmitted and recorded my own locations and movements, using a SPOT locator and GPS as part of an ongoing project to place my own lines of movement in the Canadian North within other human and animal lines of North. While flying out of Ivvavik, the trace of animal scat and paths beneath my feet grew distant until the lines and land below disappeared from my view.

Once I got home, I downloaded my SPOT transmissions and GPS locations, and fed them into *Google Earth*. I inserted myself in the virtual landscape that represents Ivvavik on *Google Earth*, re-imagining walking over their paths as my own lines crossed where animals have been. And then I tried to find routes of animals in that area as I *turned the on World Wildlife Foundation Polar Bear tracking layer*. (Fig. 1. Proximities)

I wanted to see where the animal lines of movement were while I was in Ivvavik. Information about caribou movements is no longer delivered live, to discourage the research from being used by hunters, and I knew that in summer the polar bears would not be inland as I had been, but along the coast. We really had not been so close to each other, yet in a zoomed-out view, their lines seem seem close to my solitary 'tent' marker in a seemingly barren landscape. But the North has a myriad of presences and relationships that are not always seen by those who are not there. I opened more layers to see what else

might be in my line of movement if I were to imagine my location on the map as a short stop in the migration of a caribou. *I turned on more layers.*

Fig. 2 Oil, Caribou, Polar Bear layers.

Immediately visible in the layers imported from the *Sierra Club*'s data on oil development in the North Slope of Alaska is the amount of human presence that impedes upon movements of animals in the north. The large X areas represent caribou habitat area in this view, however the actual area according to the Porcupine Caribou Management Board is much wider. Numerous studies have shown that caribou movements are affected by human presence, so we can reason that caribou migration patterns towards calving grounds on the north slopes of Alaska and Yukon may shift as a result of increased oil and mining exploration. Not evident in the map are the other shifts that will impact the movements and habitats of animals in the north – shifts created by climate change, which along with human activity will alter the north as we have known it.

In my contribution to the book *Far Field: Digital Culture, Climate Change and the North*, I detail ways in which 'ideas of north' and our cultural representations must shift as a result of climate change and human activity (such as mineral exploration, increased shipping with more open water, and military activities as northern governments try to assert sovereignty).

In that essay, I mention maps of animal and human presence in Lancaster Sound in Nunavut that were created from traditional knowledge contributed by Inuit who live in that region. "In the 1970s this area was mapped out for animal and human use (Inuit hunting and ship traffic, as well as early oil and gas exploration in the region). Inuit from the region provided valuable information about animal presence and hunting, and recently their traditional knowledge in the form of archival recordings and hand-drawn maps were digitized to produce a map showing lines of traditional Inuit land-use in the area. This map showing historical use proved invaluable in the recent blocking of seismic mapping in Lancaster Sound and in the establishment of a new Canadian National Park whose borders are now being defined by these traditional lines." These maps have not only defined an area for protection from drilling rigs, (although not from commercial shipping), they have contributed to a new understanding of north that diverges from colonial maps – a view of north that reflects knowledge of insiders and recognizes the importance of their knowledge as data.

It is tempting for those who live at a distance or visit only on occasion to see the north through the lenses that are accessible, especially online information like animal tracking data. And while accessing this and other information, such as sea-ice data or weather maps is helpful to understand threats to the North, we only show one aspect of north this way, a north represented through an outsider's remote access to knowledge of place. This kind of interpretation can be valuable, and when included with data or narratives from those who live there or through one's own direct experience of place, a new idea and representation of north may develop.

My travels and personal histories growing up in Northern Canada combined with my ongoing research online and in *University of Alberta's Circumpolar Institute*, have pushed me to create works in a range of media that attempt to temper or subvert my own romantic histories and experiences of north. I have been devising works that combine spectacular imagery I have taken up north of polar bear carcasses, sea-ice, fragile northern landscapes, and decaying toxic human mining or dew- line sites with information strips that are meant to add 'layers' of information that can help us read into other aspects of what

that imagery might be of. An image of sea-ice when exhibited is shown with information on what ecologies and animals are supported by the ice, such as the marine animals who breed and live on and under the ice, so that further sea-ice decline implies an impending doom also for what we do not see in the image. In *Far Field*, I describe it as follows:

"... data-sets of knowledge can form new ways of reading images that would otherwise function as spectacle through the knowing--lens of systems awareness. For instance, *we don't see the animals, but we know:* they are never far from ice. Walrus, seals, and polar bears use sea ice for courtship and mating, resting, giving birth and denning, and stalking and hunting for food. Below sea ice, narwhals also have a close relationship to it — using dense pack ice for wintering grounds, following ice, finding fish to eat, hiding from killer whales, and sometimes being trapped in fast ice."

Other images are exhibited with related data such as presence of toxins at DEW-line sites, former mining sites, and melting glaciers, or historic data about human traffic on the Northwest passage. These images provide extraneous related data such as toxins that are present at DEW-line sites, former mining sites, and melting glaciers, or historic data about human presence along the Northwest passage. The photos were taken either on artists residencies or while traveling in the Arctic and could easily be replicated by many tourists passing through the north. In these images, data and indexing interrupts the spectacle or romanticism of the image and allows us to see the images in data-sets that are intended to interrupt neo-colonialist views of north that are repeatedly presented in even contemporary works that celebrate the sublime while sublime creatures and environments of the north are threatened.

Watching tracked animals continuously online and occasionally in real northern landscapes encountering them or their traces in paths, carcasses, or evidence like hair and fur has made me feel somewhat closer to animals of the north. How can I represent them in a way that also conveys the difficulties they face as we continue to impose on their habitats or as their habitats change due to climate change?

While I have been working on images and sculpture related to this, it has lacked the kind of physical and material experience I wish to translate data into. As a result, I have been devising several patterns and instruction pieces for choreographed movements – the first was used for installation works that implied shifting sea ice, but the new ones attempt an empathic understanding through replicating aspects of animal and human movement, and how those movements have been or could be hindered.

This work, titled "North, Interrupted" is a set of instructions for performative movements and activities through and across ice and snow that will be placed online this winter as part of a participatory performance work. Individuals in northern and southern climates will be invited to participate in a performance where we reproduce the lines of movement of several caribou and bears I have followed, with occasional interruptions that represent encounters with predators, extreme weather that reduces access to food or creates other impediments, and encounters with human-created interruptions such as seismic activity, oil spills, or pipelines. A second set of movements relates to human presence in the north, from early explorers to recent tourists, to those who live there.

This work intentionally is fed by both technological and non-technological systems of information and knowledge, and inspired by early conceptual practices, but even more by experiences of north, my own and others as a means of expressing space and place, and contemporary politics of north.

References and Notes:

1. *Sharpe, Leslie. "Voices, Lines, Cracks, and Data-Sets: Formations of a new 'idea of the Canadian North" in Far Field: Digital Culture, Climate Change and the Poles, edited by Jane Marsching and Andrea Polli, Intellect Books, UK. 2011.*
2. *ibid.*

ART AND PLAY IN INTERACTIVE PROJECTIONS: THREE CASES

Geoffrey Shea, Michael Longford & Elaine Biddiss

We examine how three art-related projection projects approached issues of viewer participation, interactivity, user input and artistic expression differently. Each project presented video projections to a non-specialist audience with software controlled interactivity. One objective was to create an ambient play experience in a public space – something without a beginning or an end that participants could join and leave casually.
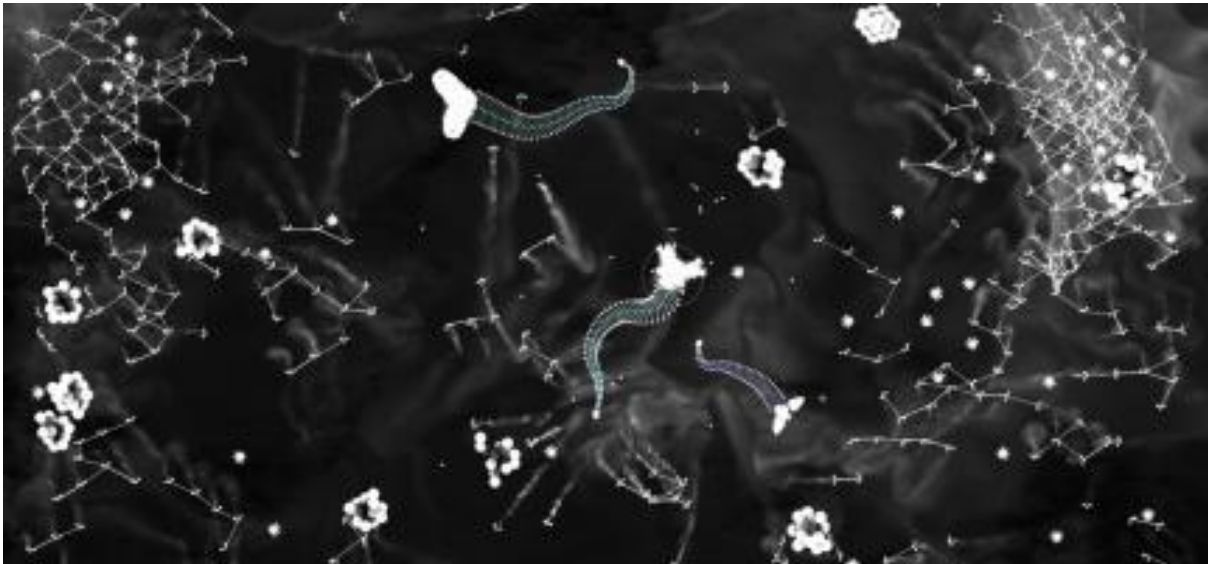
Fig. 1. Tentacles, 2011, interactive video projection, R. King, M. Longford, G. Shea. Image: R. King.

Fig. 2. Trio, 2010, interactive video projection, Geoffrey Shea. Photo: G. Shea.

Fig. 3. Viewers interacting with Tentacles, 2009. Photo: Geoffrey Shea.

Terms of Engagement

The three interactive video projects presented here were led by the authors and emerged from an academic research context. The projects started with different assumptions about the user, different communication goals and different production and collaboration strategies. Although they share some features with simulations, they all avoid standard gaming conventions; there are no levels, no overt objectives, no winners or losers.Additionally, the core requirements of each project were linked to the contexts they emerged from: experience design, art practice and healthcare delivery.

In each of these three productions, *Tentacles*, *Trio* and *The Art of Waiting*, the viewer is encouraged to participate in unstructured play. As with every interactive experience (and in fact, most other things in life) there is the initial satisfaction resulting from simply figuring out how one's decisions, gestures and actions cause reactions and create effects in the surrounding environment.

Tentacles is a large public projection with game-like user controls accessible through an iPhone. [1] In *Tentacles*, launching the app on your phone instantiates your creature on the screen. The main control interface on the phone allows you to move your creature around in the projected space. Some things you encounter make you bigger and some make you smaller. You might find yourself the sole inhabitant of this watery world, or you might share it with other players standing nearby. But what you do beyond that is up to you. We observed that some players try to grow their creature by directing it towards nourishing bits floating around, only to find that the bigger they become the more sluggishly they react to the controls. Others entangle with their peers, either affectionately or aggressively, thrusting themselves about like virtual egos. Finally, there are players who seem to delight in simply moving around on the screen, perhaps dancing, flirting or simply pleasing onlookers with their grace and style. This spontaneous performance could be the form of action which most connects the player with their creature. Proudly aware that they are watching their own avatars, we have often observed players with their free hand outstretched towards the screen, pointing out their movements to their human friends, but also appearing to want to touch their creature, in a way reminiscent of Michelangelo's image of God reaching to Adam in the Sistine Chapel.

Trio is an interactive video art installation displaying three folk musicians playing a song together. Viewers using mobile phones can switch between different musicians to create alternate arrangements of the song. In *Trio*, like *Tentacles*, there is much happening on the screen before the viewer even chooses to interact. Three large projected musicians sway gently as they strum and pluck their country music song. A prominently displayed phone number encourages people to engage by dialling in, but with little explanation of what they might expect to happen next. Unlike *Tentacles* however, *Trio* presents a dense layer of detailed instructions once the viewer has logged in. Prompted by a long rambling poem on the other end of the phone line, the viewer learns they can control the images by substituting one musician for another:

"Press 1 to reach out to Iriz. Press 2 to connect with Steven. Press 3 to tickle Diego. 1 for bass; 2 for uke; 3 for squeezebox, 4 for zither, 5 for slower, 6 for faster, 7 for heaven, 8 for eleven, 9 if you want to call Golan Levin, 0 for naught, 0 for naught..." [2]

At first the parameters seem straightforward: substitute one musician for another by pushing the buttons on your phone. But beyond that, the rules are invented by the players. Some might try to press the right button sequence to put together an all-girl band. Or a bearded band. Or create a grunge version of the ensemble. At the same time other players in the crowd are thwarting your plans because they have their own agendas. The loose structure of the play interaction encourages this sort of spontaneous improvisation and ad hoc gameplay. Whatever value the content had for the viewer is supplanted by the thrill of empowerment over the interaction.

In the third project, *The Art of Waiting* fused the productive impulses of the designers with those of the players. [3] A group of university art and design students worked with researchers at a children's rehabilitation hospital to produce interactive experiences for a large-screen projection in a clinic waiting area. The requirements were unusual. A nine square-meter area with an array of 100 densely packed pressure sensors in the floor created an input sensor that would be equally accessible to children with motor impairments including those using wheelchairs and assistive devices. Even parents and attendants could engage from their seats at the periphery of the area by reaching a toe in and touching the floor.

The designers of this interactive environment had therapeutic goals in mind. [4] In order to calm children before potentially stressful medical appointments and to empower mobility restricted children, the interactions needed to reward slow or static behaviours as much or more than energetic behaviours. Collaborative or social actions were also considered desirable. And since many visits involved more than one period in the waiting area, persistence within the interactive experience would create a sense of familiarity and comfort for children returning 30–40 minutes later.

The third year art and design students created two fully functional interactions which addressed these demands. One depicted a sloped grid of 100 squares, each corresponding to one of the in-floor sensors. A player pausing on a sensor would cause a virtual plant to begin growing on that spot on the screen. Moving to another sensor would cause the original plant to shrink and start another one growing. But if a player stayed long enough in one spot, their plant would become more permanent, persisting over a period of time proportional to the time spent creating it. Slowly moving across all of the sensors would create a virtual forest and several players working together could come closer to achieving maximum density.

As with the previous examples, the richness of the imagery suggests that the 'game' is fully fashioned and that one simply has to discern the rules. But once again, the activity ends up encouraging unstructured play, and social rules of engagement are negotiated in real time among the participants.

User Control – Input Paradigms

While all three of these installations share a common presentation form – a single projected video image controlled by software – they each use different techniques and strategies for collecting input from the users. *Tentacles* and *Trio* use handheld devices and *The Art of Waiting* uses environmental sensors.

Tentacles was originally designed to be controlled with an iPhone or iPod Touch and was later extended to include the iPad and Android devices. The application presents a graphic interface that reflects the images projected on the large screen. Users drag their fingers across their touch screens to steer their creatures around in the projection. The further they move from the centre of their handheld screen the faster their creature moves. There is visual feedback on the small screen to indicate direction and speed.

In addition to the visuals, however, there are sound components which go further to link the large screen to the small screen of the device. A background soundtrack plays in conjunction with the large image, augmented by smaller musical elements which play asynchronously on each user's device. When you engage, your handheld unit springs to life, emitting sounds which intersect with the musical soundscape, calling to and enveloping passersby and proliferating as more people join in. At this point players and non-players become acutely aware that the creatures on the large screen represent participants who are in the crowd all around them. The multiple sound sources, like the multiple participants holding their small devices, combine to form one single social entity, which is only partially revealed on the main visual and aural display in front of them.

The custom device application for *Tentacles* is meant to extend the experience from the large screen to the small screen and to afford control features specifically designed for this interaction. In contrast, *Trio* uses the familiar paradigm of a phone call directed to an automated response system. Prerecorded messages prompt uses to input their control choices by pressing the number keys on their phones. While hardly intuitive, this form of interaction is so familiar to anyone who has ever tried phoning a company or institution that users quickly move on and begin exploring how their choices affect the projected images. Separate from the longwinded recorded message, patterns correlated to the user's input begin to emerge. The leftmost musician on the screen can be swapped with two others by using the leftmost buttons on the keypad: 1, 4 and 7. The centre musician is controlled with the centre keys: 2, 5 and 8. And the right with the right: 3, 6 and 9. This discovery frees the user from having to try to understand the complex verbal instructions. Additionally, the one anomalous key: 0 turns out to create a short, stuttering effect as though pressing it came close to crashing the system.

The decision to use the simplest phone interface was based on several considerations. First was the techno-social fact that not everyone has chosen to invest in a touch screen phone and their data subscriber plans (about $80/month in Canada). Second, the imagery in the work features a cultural celebration that is somewhat out of sync with contemporary media culture – i.e. folksy, amateur musicians – and seemed incongruous with a slick, technical presentation. Finally, the separation of the recorded message from its functional value allowed it to take on its own poetic role within the overall experience. Once users figured things out and became engaged with controlling and altering the large public images,

and once they had shared the experience with friends and strangers, they would often return to the spoken text on the phone, as though to a little private performance in their ear. As with Tentacles, Trio uses the handheld device to create a small scale, private experience within the larger shared public interaction.

So many interactive installations rely on sensor input (rather than device control) that it is not uncommon to have young people walking up to a screen and start waving their arms around expecting it to respond. *The Art of Waiting* chose to use in-floor sensors for user input for reasons related to the specifics of the user group. The installation is to be installed in the clinic waiting area of a children's rehab hospital. Users of the waiting area range in age from infants to 18-year-olds. Many have physical or cognitive disabilities and most are waiting with their parents or an attendant for a medical examination, treatment or diagnosis. The goal of the project was to create an interaction that would be accessible to almost all users of the space, and that would be a calming activity in a potentially stressful situation. [5] Relatively few of the users were likely to have cell phones or other devices. Switches and touch screens were considered too inaccessible to users with limited motor abilities and also created risks associated with infection or contamination. Motion sensors typically use some kind of camera which was considered inappropriate for a sensitive medical facility. The floor sensors were chosen as the most accessible means of input, regardless of ability. A grid of one hundred 30-centimetre square tiles is installed under a carpet in an area bordered by chairs. With this configuration, every visitor to the space is automatically providing input to the system. Even a passive engagement – merely being present – causes actions and transformations to take place on the projection screen.

Scale = Public = Shared = Social

The interplay of scale in the first two installations – the small screen in the palm of one's hand contrasted with the large public screen on the facade of a building – parallels other central human experiences. The intimacy of touch, for example, is contrasted by the dominance of projected, broadcast visual stimuli, while the screen – the sign –forms a kind of text waiting to be read. Your personal space simultaneously shrinks and expands as the tiny gestures you make with your fingers are magnified for all to see. Public and private stand in stark contrast, highlighting dichotomies like wireless and wired, perception and cognition, knowing and being.

Operating from within the crowd, viewers or players had the opportunity to step onto the stage of the projected environment – to display themselves in action, engaged with other virtual beings. Movements, gestures and displays become part of this spontaneous public performance, suggestive of the activity on a dance floor, where typical rules about decorum, reservation, engagement with strangers and physical contact are suspended. Each private, gestural experience is amplified publicly as a by-product of being within a crowd.

Taking action in public in this way constitutes one layer in the creation of community. Our behaviours and others' meld to generate simultaneous effects, creating a joint awareness that forms the cornerstone of our collectivity.

In all three installations play is presented as a free-form, creative activity – a childlike enthrallment with exploration, skill-learning and sharing. The scale and location of the displays encourages parallel play and the growing awareness of the activities of other players nearby. The public nature of the experience

creates the opportunity for ambient performance, where other players' awareness of you subtly influences and rewards your behaviour. Finally, these factors combine with the ambiguous structures and activities built into each project to encourage social play and collaboration in an emerging, shared activity.

Games – or rules-based play – emerge later in life and become the standard in the adult world. But the works presented here offer a simpler experience to their users – one that is direct and immediate.

References and Notes:

1. Tentacles' official Web Site. http://tentacles.ca/ (accessed September, 2011).
2. Geoffrey Shea, Trio, 2010, http://geoffreyshea.com/?portfolio=trio (accessed September, 2011).
3. E. Biddiss, P. McKeever and G. Shea, "The Art of Waiting – Interactive Displays in Healthcare Settings" (paper presented at CHI 2011, Vancouver, May 7-12, 2011). http://largedisplaysinurbanlife.cpsc.ucalgary.ca/PDF/biddiss_final.pdf(accessed September, 2011).
4. P. Jessee, H. Wilson and D. Morgan, "Medical Play for Young Children," in Childhood Education 76, no. 4 (2000): 215-218.
5. C. Spielberger , R. Gorsuch and R. Lushene, STAI Manual for the State-Trait Anxiety Inventory (Palo Alto, CA: Consulting Psychologist Press, 1977).

VISUALISING INVISIBLE NETWORKS AS COLLABORATIVE ARTS PRACTICE

Pip Shea

This paper examines approaches to the visualisation of 'invisible' communications networks. It situates network visualisation as a critical design exercise, and explores how community artists might use such a practice to develop telematic art projects – works that use communications networks as their medium. The paper's hypotheses are grounded in the Australian community media arts field, but could be applied to other collaborative contexts.

Figure 1: creative visualisation of a mesh WiFi network.
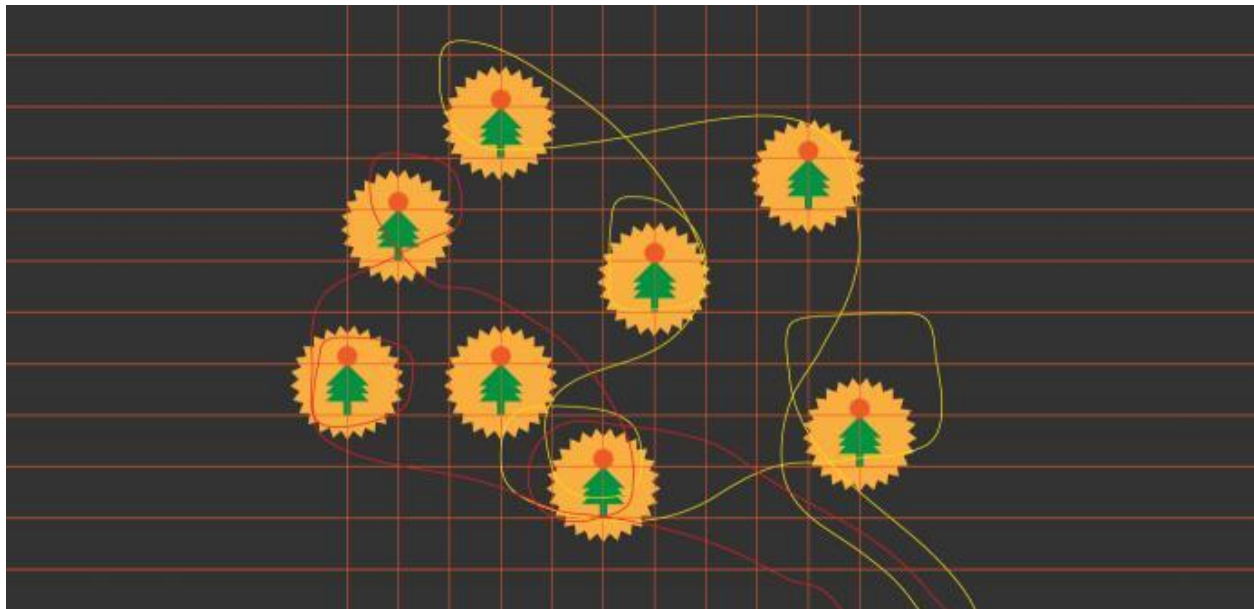
Figure 2: visualisation of anticipated movement through a WiFi installation.
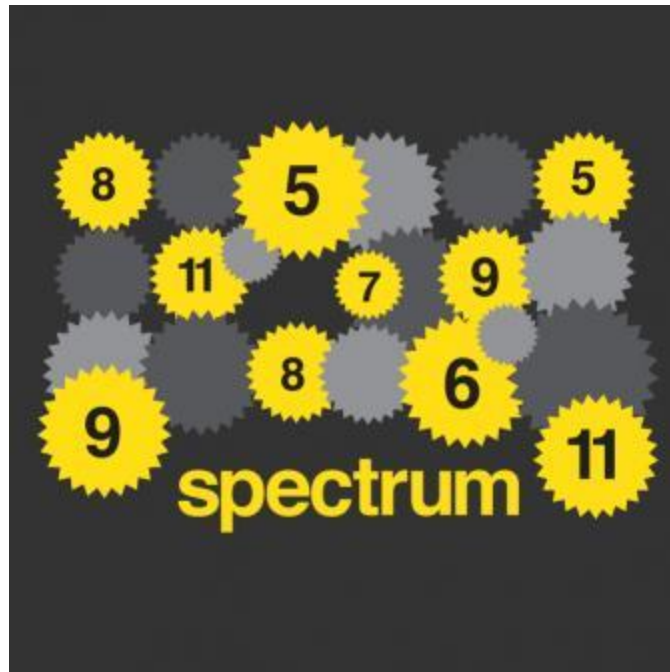
Figure 3: visual response to the wireless spectrum.

The Community Media Arts Context

Community arts and development has traditionally been considered a collaborative creative pursuit. In Australia, the field has occupied various positions on the activist, cultural and welfare spectrums since the 1960s. It has been considered an avenue for political activism, cultural democracy, self-determination, civic engagement, capacity building, community collaboration, empowering the marginalised and skill building.

The founding community arts practitioners rejected the notion that creative practice was for the pursuit of high art and the exclusive domain of the professional artist. The field's mandate was to reframe art as a practice available to anyone, and to reconfigure arts policy to support such activities (Hawkins 1992). Practitioners communicated this idea through the term 'cultural democracy', emphasising the decentralisation of the means of cultural production. Although the notion of 'cultural democracy' has traditionally framed community arts and cultural development practice, I would argue the term 'building agency' better describes the community media arts field's current agenda.

My notion of building agency, in a community media arts context, involves using creative practices to nurture people's capacity to act in the world. One approach to this scenario involves helping participants gain a better sense of their personal ethics, by engaging them in creative practices that raise their awareness of the dynamics of everyday situations. This heightened sense of one's own boundaries creates opportunities for self-reflexivity, and could move the individual beyond merely having agency, towards more considered, conscious action.

The everyday situation this paper is concerned with is participation in digital communication networks, an activity that is defining the current cultural moment – the networked moment. This networked moment presents both a new source of power and knowledge and a new site of privilege and inequality – a spectrum of effects that manifest as a result of network actors. The premise of the paper builds on this dynamic, and proposes that visualisation may be used to uncover and reveal these actors and hence the power relations among them.

Critical Network Participation

This paper's consideration that CMA practices should nurture people's critical literacy around everyday situations, moves beyond the dominant mode of addressing new media participants – from those who use networks, to those who understand networks. In doing so, it challenges 'storytelling' as the dominant mode of CMA practice – a dominance that emerged due to low-cost video production tools becoming widely available in the mid-nineties, which led to a contingent of film-makers becoming involved in community arts projects – a contestation of the status quo similar to Hecks' (1985) questioning of the acceptance of community arts folk aesthetics in the 1980s. So as CMA in Australia realigns its logics to the networked moment, nurturing capacities to critically navigate communications networks, should be become part of the remit of practitioners.

Network users are faced with an evolving set of signs, protocols and pragmatics that affect navigation and participation. Often these functions "operate at a level that is anonymous" or invisible, which "makes them difficult to grasp" (Galloway and Thacker 2007, 5). Anonymous network actors represent forms of control that include interfaces, processes, software, and hardware – selecting, adding, withholding, displaying, channeling, shaping, disregarding and deleting (Barzilai-Nahon 2008). These protocols are inescapably related to power, meaning questions relating to participant agency naturally become a concern of the community media artist.

Building network agency is inextricably linked to developing an awareness of network structures and dynamics; and this exploration begins with the consideration that technological development is not an autonomous occurrence, but rather a social, nonlinear process. The interplay between technology and culture is situated in relationships – both human and technological – whose complexities can be understood by considering their "articulations and assemblages" (Slack and Wise 2005, 109). Articulation and assemblage looks to the web of connections contributing to the technology and its impact on society. The cause and effect binary is replaced with an appreciation of the matrix of actors, non-actors and liminal spaces that impact societal change.

Visualising 'Invisible' Networks

Visualisation techniques range from abstract representations to more analytical cartographic approaches. They are an increasingly popular method of framing information and are used to encourage the practice of connection-making. The approach I am suggesting for the community arts context falls towards the abstract end of the network visualisation spectrum – a fair distance from data-driven network visualisation, which is based on network theory and mathematics.

By rendering the matrix of actors in networks 'visible' through visualisation, we can begin to map connections, flows and blockages. We begin to form a picture of the social and technical forces at play. The objective of visualising 'invisible' networks is to interpret the articulations and assemblages of networks, exposing participants to the idea that "the very notion of a network is in conflict with the desire to gain an overview" (Mackenzie 2010, 9). It is also to expose the binary nature of networks – that they operate on the logic of inclusion/exclusion and that they are both self-configurable and programmed (Castells 2009). These objectives respond to Ascott's essay *Gesamtdatenwerk* (1989), where he describes the process of "making the invisible visible" as "the great challenge of late twentieth century art" (Ascott 2003, 222).

Visualising communications networks may also help decipher emergent nodes of connection or significance. This process of projection may help anticipate the potentiality of a network. Take the case of wireless networks. MacKenzie proposes that "wirelessness, affects how people arrive, depart, and inhabit places" (2010, 5). Becoming more conscious of these invisible dynamics could increase people's sense of how "their wireless devices are expanding and multiplying relations, overflowing existing infrastructures and environments and realigning senses of personhood at many junctures and on different scales" (2010, 12).

Working with visualisation techniques to highlight the power dynamics with networks may also help community media arts participants develop critical visual skills. These might include tools for the production and analysis of visuals, such as information design or the registering of embedded ideologies within visual material.

Network Visualisation as Telematic Art Process

This paper supports telematic art as an approach for community media artists, and offers network visualisation as a preliminary (critical) design task for the creation of telematic art. Network visualisation activities may provide a critical entry point for the design of telematic art projects, as participants begin the artistic process by engaging with the structures and dynamics of networks. This approach is designed to provoke, inspire and question fundamental assumptions about the role technology plays in everyday life.

The term 'telematic art' was introduced in 1978 by Roy Ascott, whose creative work and writing had a significant influence on early artistic explorations of networks, including experiments with video and satellites in live performances; and, collaborative story-making using computer networks. The term is still used to describe artworks that use communications networks as 'material', but such projects are also referred to as 'networked art'. I have chosen the term telematic art as I feel it situates communications networks as a medium of the work.

Speculative Design Proposal: *WiBuy*

Critical Design, popularised by Anthony Dunne and Fiona Raby, takes a critical theory approach to design, and uses speculative design proposals to challenge assumptions we have regarding the products

we use. This paper draws on notions of Critical Design, to offer a speculative design scenario through which to explore its themes. It also looks to critical design to provide a framework for combining the aesthetics and ethics of network visualisation, allowing community artists and participants to explore what Anne Galloway, drawing on Latour, describes as "matters of concern rather than matters of fact." Critical Design pulls focus on how the design process arranges relations between things, ideas, people and places, and in turn, triggers a critique of communications networks, building awareness of anonymous network actors.

The speculative community media arts project I am proposing, titled *WiBuy*, will be a ten-week workshop series followed by a public outcome that will form part of a day-long community festival. The work will use a temporary mesh WiFi network, WiFi enabled mobile phones and mapping software to devise an outdoor, locative media installation.

The project draws on the practice of geocaching – an orienteering activity that involves hiding and seeking out 'caches' in publicly accessible places. People use mobile devices and other navigation techniques to find the 'caches', which are often small containers that contain a logbook or historical information about the corresponding site. *WiBuy's* caches will be a digital download of a tutorial on how to make something. The nature of these do-it-yourself (DIY) activities, decided by project participants, range from making cakes solely from raw ingredients, to building your own bicycle from bamboo. Each digital 'cache' is assigned to a particular WiFi router, which means that people have to move around the festival site to gather them all.

An important aspect of this locative media project is the mesh wireless local area network (WLAN). Mesh networks enable WLANs that cover large distances. Their topology is distributed, meaning the architecture is decentralized and connections form in an ad hoc way through 'repeaters' that spread the wireless signal. Mesh networks also make it easy to share excess bandwidth with the network – this can be thought of as similar to putting electrical energy 'back in to the grid'. At the initial project workshop, the CMA practitioner might begin by guiding the participants through visual explorations of the dynamics of mesh networks, and their associated signals and dynamics. Figure 1 is an example of a mesh network visualisation – the yellow dots show the main nodes that have a direct connection to the Internet, and the orange dots respresent the mesh repeaters that share bandwidth. The CMA practitioner would be careful to remind participants at various stages of the project that the network visualisations they create are only conceptual explorations of network dynamics, and are not fully representative.

There are a myriad of ways for the CMA practitioner to get participants thinking about and visualising networks. Figure 2 is an example of how visualisation techniques could be used to anticipate the movement of people through *WiBuy*; and figure 3 is a visual response to thinking about the wireless spectrum, where the yellow starbursts represent active channels. The type of mobile device and software people would be using to access the digital download could be used as subject matter for a network visualisation. CMA practitioners might also draw on Dunne and Raby's metaphor of the spectrum as a "nervous system" (2001, 18). This would provide an entry point for understanding 'hertzian space' as a real landscape (Dunne and Raby 2001).

Conclusion

By using network visualisation techniques in telematic community art projects, participants have the opportunity to unveil the actors within networks. This process is applied with the aim of increasing critical participation in communications networks. Critical network participation builds from a heightened consciousness around the articulations and assemblages of networks, and has the potential to improve connection-making abilities. This encouragement of visualisation practices around communication networks may also develop critical design skills around the production and analysis of visual material.

References and Notes:

A. Dunne and F. Raby, Design Noir: the secret life of electronic objects (Basel, Birkhauser, 2001).

A. R. Galloway and E. Thacker, The Exploit: a theory of networks (Minneapolis, University of Minnesota Press, 2007).

A. Mackenzie, Wirelessness: radial emiricism in network cultures (Cambridge, MIT Press, 2010).

B. Latour, Reassembling The Social (Oxford, Oxford University Press, 2005).

B. Latour, "Networks, Societies, Spheres: reflections of an Actor-network theorist" (paper presented at Annenburg Networks Network, Annenburg, CA, 2010).

G, Hawkins, From Nimbin to Mardi Gras: constructing community arts (Sydney, Allen & Unwin Pty Ltd, 1992).

J. D. Slack and J. M. Wise, Culture and Technology (New York, Peter Lang Publishing Inc, 2005).

K. Barzilai-Nahon, "Toward a Theory of Network Gatekeeping," in Journal of the American Society for Information Science and Technology 59, no.9 (2008): 1493-1512.

M. Castells, Communication Power (New York, Oxford University Press, 2009).

R. Ascott, Telematic Embrace (Berkeley: University of California Press, 2003).

R. Hecks, "Rethinking Community Arts," in Meanjin no.4 (1985): 553-555.

W. E. Bijker, Of Bicycles, Bakelites, and Bulbs (Massachusetts, MIT Press, 1997).

OBJECT GEOGRAPHY: THE INTERNET OF THINGS

Duncan Shingleton

This paper investigates how objects in the Internet of Things, endowed with informational clouds, could create a new layer of complex relationships that were previously not visible in our networks. Consequently it allows us to rethink our understanding of the structure and agency of a network, by examining the pattern of interactions represented by how people to people, people to things, and things themselves are connected to one another.

The emerging phenomenon known as the Internet of Things (IOT) refers to the technical and cultural shift anticipated as society moves towards a ubiquitous form of computing that facilitates the connection of everyday objects and devices to all kinds of networks. The analog bar code that has for so long been a dumb, encrypted reference to a shop's inventory system will be superseded by an open platform in which every object manufactured will be traceable from producer to distributor, and potentially every single person who comes into contact with it following its purchase. Furthermore, every object that comes close to another object and is within range of a reader could also be logged on a database and used to find correlations between owners and applications.

The Internet of Things creates a link between concrete objects and abstract data, producing a hybrid of physical and electronic spaces that enables communication and interaction between people and things, and things themselves. It is an all-encompassing framework to reflect on and design towards more digital connectivity, a system that is local and global, accessible in real-time from any location. Through item based tagging and identification, the Internet of Things will take ubiquitous computing – anytime and anywhere communications – to the next step in networking: 'anything communications'. However the Internet of Things is at risk of simply becoming a platform whose primary benefit is to offer improved indexing and tracking of manufactured consumer goods from cradle to grave. Therefore this paper aims to re-contextualise the Internet of Things, and explore theory relating to the attachment of data to an object, and as a result the role objects might have in our networks.

THE IOT AND INFORMATIONAL SHADOWS

The significance of Internet of Things is that through technologies like RFID and 2D barcodes, it offers a low-impact way to 'import' physical objects into the data-sphere and endow them with an informational shadow (Greenfield, 2006). As the Internet grows, will we see it encompass more and more elements of the real world, as "ordinary objects, from coffee cups to raincoats to the paint on the walls, would be reconsidered as sites for the sensing and processing of information…where ubiquitous means not merely in every place, but also in everything" (Greenfield, 2006). The Internet of Things leads us into a new era of ubiquity, where the 'users' of the Internet could be counted in billions and where humans may become the minority as generators and receivers of traffic, and instead most of the traffic could flow between devices and all kinds of 'things'. Radio Frequency Identification (RFID) is seen as being a key enabler in the Internet of Things due to its ease of distribution, low cost, technological simplicity and is therefore a logical candidate for bottom-up tracking and tracing of things, and the ways in which

things move around. As a pull technology, the RFID reader emits energy so that a tag provides its unique number, identifying itself. In combination with the Electronic Product Code, the next generation of production identification that identifies objects in the supply chain, it becomes possible via an Object Name Server to map the object to a IPv6 address in a database, and through Physical Markup Language represent data about that object. This means you can track a bottle in your room, provided there is a reader in your door, floor or building, and through a simple web query it can be accessed via the web, for example from Tokyo (Rob van Kranenburg, The Internet of Things: A critique of ambient technology and the all-seeing network of RFID, Amsterdam: Institute of Network Cultures, 2007). As an informational shadow is created for every object connected as a node to the Internet of Things, what does the shadow look like and what is its affect on an object?

Most implications of an Internet of Things consist of programs resulting through the convergence of identification and location technologies related to the manufacturing process for consumer goods and their associated logistical systems, such as stock control and product tracking. These systems offer the ability for the condition of an object to be recorded in a variety of forms and streamed to databases that can be correlated and mined to ensure that things, for example, are in the right place now or have been in the right place in the past, have been kept at the right temperature and handled by the right people (Speed, 2010). Sterling terms theses objects 'Spimes' – objects that can be tracked through space and time, and throughout their lifetime. Spimes are regarded as "material instantiations of an immaterial system, they're virtual objects first and actual objects second", which "begin and end as data" (Sterling, 2005). From books to frozen peas, parcels, to even people, things move through scanners to update their location; if that location has particular properties, then aspects of its condition complement the data that is associated with the object. "In this way, things carry data about the world around them" (Speed, 2010).

However the ubiquity of smart-phones and online platforms such as StickyBits, Itizen and Tales of Things (http://www.talesofthings.com), offers individuals the ability to re-appropriate previously closed channels and tag physical objects with memories, stories and media content. Anders (2001) discusses the ability of an object to be the methodology for the mapping of space and information, a 'cybrid reality' – "I have a physical object here that notes my handling of it and displays its contents to me in this way". The change in informational processes become spatial in nature and in direct relationship with the physical, resulting in a virtual and physical world that correspond with each other, comprised of entities that 'cybridize' within that world. This ability for material artefacts to become an interface to the Internet of Things is addressed in the artwork RememberMe (http://fields.eca.ac.uk). The RememberMe artwork was a collaborative project with the Oxfam and FutureEverything 2010, where people who donated objects were asked to tell a brief story about them into microphone – where they acquired it, what memories it brings back and any associated stories. These audio clips were then linked to an RFID tag and QR code and attached to the items as they joined the shop's stock. Visitors to the shop, including conference delegates were able to use bespoke RFID readers, or their own smart phone to browse artefacts that were displayed amongst the many thousands of other objects. Labels highlighted the RememberMe objects and once triggered, speakers located in the shop replayed the previous owners story, evoking a ghost from the past. Once tagged the objects were in the public domain for purchase by other members of the community, and the project's iPhone and Android apps allowed new owners to access old stories but equally importantly, add their own.

However when we are discussing the attachment of data to objects, whether it's labeled 'Spimes' or 'Cybrids', I question whether Greenfield's 'informational shadow' is the right analogy to use. The term shadow by its definition implies that it is the object that casts the information – the data must be read

from it. However the Internet of Things can provide a technological framework for data to be written onto objects, in situ or remotely, allowing the data to cast its own shadow on to objects that are either present in the real world, or no longer exist having been lost or destroyed. In artistic practice, negative space is used to refer to the space around or between the subject(s) of an image, and not the subject itself. The surrounding space is used to artistic effect as the 'real' subject of the image, and is used to form an interesting or artistically relevant shape. The importance here is that it is the immaterial space that is used to define the method of viewing the representation of the object for the audience. In the same way, objects in the Internet of Things become abstracted manifestations of their data whose immaterial representation may differ from their physical form. When we stop examining the physical object, and instead start seeing the immaterial data that surrounds it, the form of the object begins to disappear – by concentrating on what doesn't exist, the negative space, we can more accurately define the boundaries of what does exist. When we view an object in the Internet of Things, foremost we are viewing its data, and its form lies in the negative space created by the associations between databases tables and indexes. Therefore this author proposes it is more accurate to describe objects in the Internet of Things as having informational clouds, and like clouds which form part of a complex weather systems, objects in the Internet of Things do not exist in splendid isolation, but as part of network. Therefore question arises, what happens with these informational clouds begin to interconnect?

LOOKING THROUGH THE CLOUD

Ubiquitous digital devices are built into the world of everyday life, of social relations, places and things (Richard Coyne, The Tuning of Place, London: MIT Press, 2010), and the Internet of Things is evolving into a "conceptual framework for understanding how physical objects, once networked and imbued with informatic capabilities, will occupy space and occupy themselves" (Bleecker, 2006). This provides a technological paradigm under which we can re-conceptualise new forms of spatial arrangements.

Through an enormous quantity of new associations being generated via thing to thing and thing to people communication, The Internet of Things allows us to see a whole set of pattern relationships that were previously not visible in our networks – "society itself is to be rethought from top to bottom once we add to it the facts and the artefacts that make up large sections of our social ties" (Latour, 1992). Society, organisations, agents and machines are all effects of patterned networks generated through the interactions of actor-networks, the observation of which can only be achieved by tracking the traces left when relationships, or associations, are being produced between intermediaries (Law, 1992; Latour, 2005). Social networks are comprised by the patterns of casual interconnection and interdependence among agents and their actions, as well as the positions they occupy (Jose Lopez and John Scott, Social Structure, Buckingham: Open University Press, 2000) – in other words their relational structure is the sum total of all the social relationships of all the agents at a given moment in time.

Actor-Network Theory (ANT) can be seen as a tool for exploring and describing how the social is assembled by way of technologies; objects and artefacts, and its import is one of agency, specifically responsibility that is distributed equally across entities, including a host of nonhuman ones not normally seen as exercising agency at all. (Latour, 2005). ANT does not typically attempt to explain why a network exists; it is more interested in the infrastructure of actor-networks, how they are formed, maintained and how they can fall apart. Actor-Network Theory incorporates what is known as a principle of generalised symmetry; that is, what is human and non-human (e.g. artefacts, organisation structures) should be integrated into the same conceptual framework and assigned equal amounts of agency.

An actor is not the source of action but the moving target of a vast array of entities swarming towards it, and action should be felt as a set of agencies or translations between mediators that may generate traceable associations. (Latour, 2005). In the Internet of Things, "agency happens with the ecology of networked publics –streams, feeds, trackbacks, permalinks, Wiki inscriptions and blog posts" (Bleecker, 2006). In other words the agency lies in the flow of data between networked objects. The Space of Flows is Castels' (1996) theory relating to network society and technologies role in a new type of space; made up of movement that brings distant elements – things and people – into an interrelationship through synchronous, real-time interaction. Flows are understood by the purposeful, repetitive, pro-grammable sequences of exchange and interaction between physically disjointed positions held by so-cial actors in the economic, political and symbolic structures of society (Castells, 1996). The Space of Flow is defined as consisting of three elements – "The medium through which things flows, the things that flow, and the nodes among which the flows circulate" (Stalder, 2001). The Internet of Things can be understood in terms of these three elements – tag/reader, data and objects.

Through contextualising the Internet of Things through Actor-Network Theory and the Space of Flows we can conclude that an object's agency, meaning, functionality and value is deduced from the relation-ship created by its informational cloud when inserted as an actor into an intersection of a flow in a net-work – things are less defined by their intrinsic qualities but more by their relational position to one an-other (Latour cited Stalder, 2003). McLuhan (Marshall McLuhan and Barrington Nevitt, Take Today: The Executive as Dropout, Ontario: Longman Canada Ltd, 1972) states the "meaning of meaning is relation-ship", and by this he meant, that there is no content without context and that the importance of a piece of information, its real meaning, changes depending on what it is related to. The difference between data, information, and knowledge is the amount of relationships that are contained within it. In other words function, value and meaning in the space of flows are relational and not absolute and as the net-work changes – as old connections die and new ones are established as the flows are reorganised through other nodes (Stalder 2003), a nodes agency, meaning, functionality and value changes too. We cannot help but view the world in terms of unseen relationships where the things-in-motion illuminate their social context.

AT THE CENTRE OF THE FLOW

Actor-Network Theory proposes that the structure of networks consists of nodes both human and non-human, where associations between the nodes exist in a continuous Space of Flow. The Internet of Things offers a technological framework for this theory, connecting everyday objects to networks and providing them with a rudimentary knowledge about what they are and their environments they inhabit – given the fact that an object through a tag/reader can query a database to discover associations about itself, and any other object within its vicinity. This interconnection of objects may determine the joint effect they have on the world at that moment, as the organisation of a synchronous real-time relation-ship between the nodes of a network, gives the network as a whole the ability to exert a causal influ-ence. "Agents residing on one scale start producing behaviour that lies one scale above them: ants cre-ate colonies; urbanites create neighbourhoods; simple pattern-recognition software learns how to rec-ommend new books. The movement from low-level rules to higher-level sophistication is what we call emergence" (Steven Johnson, Emergence, London: Penguin Books, 2001). The source of relational emergence is the organisation of nodes, and the maintenance of a set of substantial relations between the nodes that constitute them into a particular kind of whole at a particular moment in time, and thus allows a node to produce causal impact in its own right (Elder-Vass, 2010).

In the study of Human Geography we are constantly reminded of how people shape their world and of how people and places vary across time and space. Places are constantly changing and people are responsible for these changes. People create cultures, values, aesthetics, politics, economics and more, and each of these affects and shapes places (Erin Fouberg and Alexander Murphy, A. and H.J de Blij, Human Geography: People, Place and Culture, Hoboken: Wiley, 2010). The structure of a network, the relations among network members, and the location of a member within a network are critical factors in understanding social behaviour. Complex, dynamic social systems are analysed in terms of stabilising and destabilising mechanisms, and traditionally it is only human agents who play strategic roles in these processes. Institutions and cultural formations of society are carried by, transmitted, and reformed through individual and collective actions and interactions. These social structures help to create and recreate themselves in an ongoing developmental process in which collective agents play constructive as well as destructive and transformative roles in the context of complex sociocultural arrangements. These arrangements of social life involve time, space and place as a constitutive factors in the construction and reconstruction of what people do and in the way they do things together, as active agents with their distinctive characteristics, motivations, and powers contributing to the reproduction and transformation of our networks. In other words societies are composed of the relations between people, and the ramifications and latticework of those relations constitute the structure of society.

However through re-contextualising the Internet of Things from a relational emergentist methodology, within the context of Actor-Network Theory and the Space of Flows, it raises questions about how our social networks will be constructed, destructed and transformed by the interactions represented when people to people, people to things, and things themselves are interconnected. The behaviour of the relations between the nodes of a network in particular temporal and spatial contexts defines the behaviour of the network as a whole. Networking objects means we could possibly gain new insights into how we make places, how we organise space and society, how we interact with each other in places and across space and time, and how we make sense of others and ourselves in our locality, region, and world. As objects are treated like code, the messages they encode will emerge from the pattern of social relations being expressed, allowing the Internet of Things to provide the meta-data that enables clusters of data to self-organise, assembled out of an unthinkable number of associations created by agents both human and non-human.

References and Notes:

Peter Anders, Cybrid Landscape, 2001, http://goo.gl/gTlnW (accessed: August 20, 2010)

Julian Bleeker, A Manifesto for Networked Objects – Cohabitating with Pigeons, Arphids and Aibos in the Internet of Things (California: University of Southern California, 2006)

Manuel Castell, Rise of The Network Society (Oxford: Blackwell Publishing, 1996)

Dave Elder-Vass, The Causal Power of Social Structures (Cambridge: Cambridge University Press, 2010)

Adam Greenfield, Everywhere (Berkley: New Riders, 2006)

Bruno Latour, "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts" in Shaping Technology / Building Society: Studies in Sociotechnical Change (London: Bijker, Law, 1992) 225-228

Bruno Latour, Reassembling the Social (Oxford: Oxford University Press, 2005)

John Law, Notes on the Theory of the Actor Network: Ordering, Strategy and Heterogeneity' (Lancaster: Centre for Science, 1992)

Chris Speed, "An Internet of Things That Do Not Exist", Interactions 33 (2011): 18-21

Felix Stalder, The Space of Flows: notes on emergence, characteristics and possible impact on physical space (Paris: 5th Int. PlaNet Congress Paris, 2001)

Felix Stalder, The Status of Objects in the Space of Flows (Toronto: University of Toronto, 2003)

Bruce Sterling, Shaping Things (Cambridge: The MIT Press, 2005)

CHOREOGRAPHING TOPOLOGICAL SPACES WITHIN DANCE PERFORMANCE WITH REAL-TIME VIDEO

Kate Sicchio

This paper will explore how the use of real-time video projection in live dance performance creates multiple spaces for choreography and how these spaces result in a topological approach to dance-tech work. Within the research, the types of space identified within choreography with real-time video projections include physical space, camera space, projection space, and compositional space.
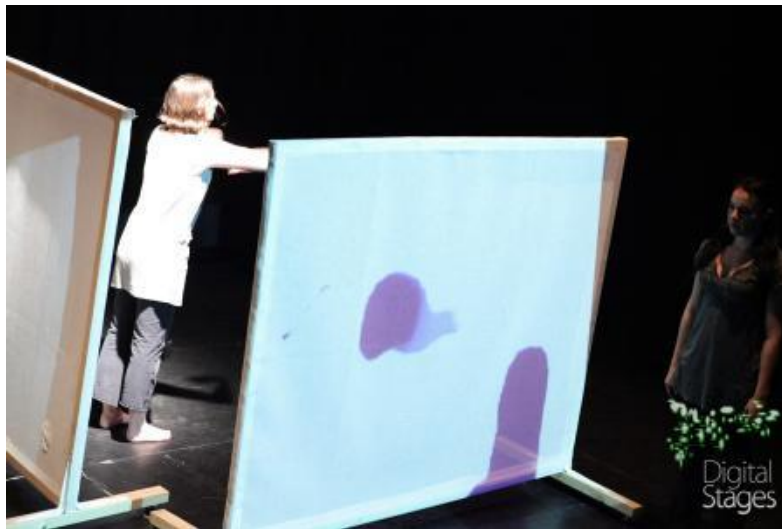
Fig 1. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt
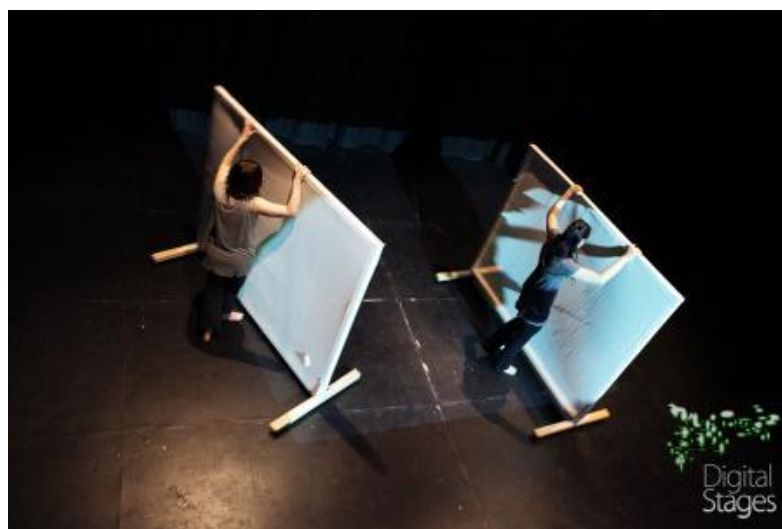
Fig 2. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt

Fig 3. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt

This paper will explore the use of space within choreography with real-time video and will discuss spaces that have been identified through a practice-as-research approach. By creating a dialogue between performance works by the author and topological definitions of space, further considerations of composition of space within dance may be considered as well as means to achieve this, such as the use of qualitative rhythm.

To begin this consider of space, a definition of choreography must be considered. In this research choreography is the nexus between space, performer, movement and sound (Sanchez-Colberg, 1992). More specifically in this research, dance works created for black box theatre spaces will be considered. This paper also considers real-time video technology. Real-time video refers to the processing of video by a computer, so it has as little latency as possible when pixels are captured. This then may be utilised by software to transform pixels using a range of techniques such as background subtraction or visual effects. Real-time video may be live footage or footage used within video tracking systems, but it has as little delay as possible (to the point where it may not be recognisable by the human eye). In this work, the real-time video creates projections, which are then incorporated into a black box performance space during a live dance performance.

TYPES OF SPACE IN CHOREOGRAPHY WITH REAL-TIME VIDEO

With choreography for the stage that utilizes real-time video projections, multiple spaces for movement must be considered. These include the physical space of the performance as well as camera space, projection space and the compositional space. These spaces form frames for movement and have interrelationships that create the composition.

To create a definition for a frame for movement, one can adapt Deleuze's cinematic concept of the frame. He discusses the frame as creating a space that maybe transformed and creates an open set. "The frame therefore forms a set which has a great number of parts, that is of elements, which themselves form sub-sets… Obviously these parts are themselves in image [en image]" (Deleuze, 1986, p12). By creating spaces that are sets of elements or movement, the frames and their relationships create a composition. "Framing becomes the means by which the plane of composition composes" (Grosz, 2008, p18). The composition of these frames will be discussed later in this paper, by examining the topological properties of these frames and the emerging choreotopology.

The physical space is the black box theatre and creates the first frame for movement. "The typical proscenium stage creates a theatre of illusion whereas smaller, more informal spaces lend themselves to performances in which events are to be seen as happening in a quotidian time and place…non-proscenium spaces communicate the proximity of life to art" (Foster, 1986, p60). The physical frame is where the dancers perform and the movement is first generated.

Camera space frames movement not only in the lens of the camera but also within the programming of computer vision utilized in dance with real-time video. Within the camera space the location and position of the camera not only effect the framing, but also transform movement into a digital space. "The distance between the camera and its subject matter, the angle, the focus, the use of lighting and the style of editing all contribute to this modification" (Dodds, 2001, p30). Camera space also involves computer vision that manipulates the movement of pixels. "Multimedia computers have become fast enough to manipulate video on a pixel-by-pixel level rather than frame-by-frame" (O'Sullivan and Igoe, 2004, p234). This manipulation of movement via programming is integral to the choreographic process.

Projection space involves the surface of the projection (such as a screen, cyclorama, etc), as well as the content of the video being projected. The projection space is a physical construct, whether it is a wall, cyclorama or custom screen, which provides a surface for video to be shown. Another component of projection space is that it is not simply the geometry of the screen or projection surface, but there is also a digital space to be considered. This aspect of projection space is where the movement captured in the camera space re-emerges as part of the choreography transformed in real-time. This frame looks to transform the movement captured in the camera space and present it back into the physical space.

Compositional space is the most topological of the spaces as it has continuous interrelationships with other spaces and it is these relationships that are choreographed into a composition. Compositional space does not act as a container for the other frames of the composition (physical, camera and projection), nor does it react with space outside those identified in the performance. While it is the territory for the dance piece, it has constantly changing relationships with the other frames that can be choreographed by exploring rhythms within the movement.

Topology and Dance Composition

Topology in its mathematical definition includes sets and subsets that are open and when sets intersect the union creates a collection of open sets. It also can be applied to choreography. "Topology characterizes dance as a precisely choreographable pattern in space and time" (Portanova and Piccirillo, 2009, p2). If each space for movement (physical, camera, projection) is considered an open set of movement, then the compositional space created by their interrelation is a combination of open sets of continuous movement (Rotman, 2009). This causes qualitative space as the continuous movement is outside of measurement and Euclidean geometry. Topology is "the process of arriving at a form through continuous deformation" (Massumi, 2002, p184).

Deleuze and Guatarri (1988) discuss the plane of consistency or composition as "not a plan(e) of organization, development, or formation, but of nonvoluntary transmutation" (Deleuze and Guatarri, 1988, p269). This idea of composition as "only relations of movement" (Deleuze and Guatarri, 1988, p266) reflects the topological nature of the compositional space within dance with real-time video systems. The measurement of the space does not determine the relationship of the live dance with the projected dance, but instead it is choreography of movement across these spaces. Examining the plane of composition as transmutation and relationships of movement, the topological design of the space becomes apparent as the composition is created through movement.

Within dance composition of space, rhythm emerges as a critical part of choreography in topological spaces as rhythm is found in movement and in time. Rhythm becomes the action, distribution and energy between the frames of space in a topological choreography without becoming a metric organizer of movement. Rhythm does not have to be quantitative to be part of movement composition, but instead rhythm creates space and time with energy in a qualitative manner, as "it is well known that rhythm is not meter or cadence, even irregular meter or cadence" (Deleuze and Guattari, 1988, p313). Qualitative rhythm is creates this composition of space by providing the temporal means for movement throughout the composition in a qualitative distribution, rather than require a measurable increment of movement, space or time.

Nayra mara - Performance at Digital Stages 2011

During January 2011 a new piece entitled *Nayra mara* was formed exploring the composition of live dance with real-time video projection. The real-time video system was comprised of a CCTV camera, the software package Isadora, a MacBook running the software and a video projector. This piece began as a solo performance and was later developed into a duet with performances at the Digital Stages Festival in London in April 2011.

An important addition to the compositional landscape of this piece was the making of moveable screens out of sharkstooth mesh, a semi-transparent fabric that allows for front projections to be seen, as well as the fabric to been through when back lit. This means that the choreography is not only movement of bodies and pixels, but now screens as well. It also allowed for projections to be in front of the dancers within the physical space, rather than always placed behind them. These movements considered in relation to each space create a dance composition.

Because of the movement and possible semi-transparency of the screens, there were a lot of spatial relationships based upon the location of the screens that had not been possible in previous work in this research project. This new movement and new relationships of spaces because of the new movement, contributed significantly to the creation of topological compositions of physical, camera and projection spaces. Because of this, the movement creates compositions that are not plotable configurations in

physical space but deformations and distributions of movement across spaces. Continuous change in location of the frames of movement means that the use of space in the piece can be described as topological.

The piece begins with the two screens in parallel diagonal lines on the stage in the black box space. One performer begins to move in the physical space and travels in between the two screens. This is the first time that the movement is seen behind the projection space, however, at this moment due to the lighting, the camera does not see the performer behind the screen. As the performer travels, the movement becomes visible to the camera and is simultaneously in the camera space and physical space. The camera space is programmed to look for the difference in pixels caused by the movement and this movement of pixels is then projected on the screen. The movement continuously flows from physical to camera to projections space and the arrangement of the movement in these frames forms the composition. As Grosz (2008) discusses in regards to architecture, the choreography negotiates the spaces existing in continuous relations to each other and the movement is present in the physical space of the blackbox, the camera space, and in the projection space of the screens simultaneously and the use of real-time technology permits a topological relationship. The performers walking around the screens follow the traveling, which is repeated several times with an increase in the speed of the walking each time. This can be seen as an increase in the energy flow and the resulting qualitative rhythm, which constructs the composition.

During the Digital Stages performance this section was not as successful in demonstrating the topological spaces because the lighting effected the projection as the dancers entered the stage. The lighting hit the screens and prevented the movement on screen to be seen clearly. There were many reasons for the lighting design interfering in this section, including the locations of the light in the rig and the lack of side lighting options. Despite this not working as well in this opening section, later in the piece a similar effect was used and was more visible to the audience, so the continuous movement was apparent and the topology was formed.

Following this section, one performer moves one screen to the back of the black box. The second performer circles the second screen around the centre of the space. The other performer begins to then circle that screen in the space. This movement of the projection space adds a new movement that is also in a continuous relationship with the other spaces in the composition. As the frame moves, the camera picks up its movement and creates a difference image that is then projected. However, the projection space in now moving in a circle and the movement from the camera space is only visible when the projection space is moving through a position in which one of its wide sides is in front of the projector. When this happens, the movement of the performer and the screen are visible briefly and then they continue to move and the image is lost from the projection space, until it is repeated moments later. The projection space now depends on time and movement to be part of the composition. This moment in the piece creates a dynamic space and illustrates Massumi's topology as a system for understanding spaces where movement is continuous. If one were to make this moment of the piece static, the movement would not be seen transforming into projection space.

In the middle of the piece the movement in the physical space begins with a gesture forward with the right arm and repeats this several times, gaining speed and momentum and allowing the left arm to join the gesture and the body to bounce as a result of the force of the movement. The movement is stopped abruptly and both arms are "caught" behind the live performer, where they struggle to release the hands from behind the body by leaning forward. Eventually they release the arms from this position and rebound and settle back to the original neutral standing position, to being the sequence again. The

movement is transformed from the physical space by the camera space and then the projection space to then join the compositional space. The result is a projection that is reflecting the gesture but has been transformed into a blurred form, which slowly increases and decreases in size based on the amount of movement in physical space.

In this section, one performer is located in front of one screen and the second performer is behind the screen. The second screen has been placed perpendicular in the physical space. After the movement sequence is repeated twice by the performer in front of the screen it is then repeated by the dancer behind the screen. The semi-transparency of the screen allows for the camera to see the movement behind the projection space. This is the first time throughout this research that the movement being performed is located behind the projection being generated. The performer then walks around to the front of the screen where the movement that was just performed has been captured and is projected as the performers watch.

Two important aspects of choreotopology are occurring in this section of the piece. The gesture creates the interrelationships as it happens across space and the choreography of these interrelationships utilizes qualitative rhythms. Because the movement can be seen through the screens, the possibility of performers being located behind the projection space is possible and creates new relationships of the physical space, projection space and camera space within the composition.

The rhythms of the movement in this section of the piece are qualitative and contribute to the choreography of topology through non-metered intensions for the timing of the movement and through the use of energies. On different planes (projection, camera and physical) and with no pre-determined meter as the timing of the movement is based upon improvisation of the live performer, this section demonstrates rhythm as qualitative. Meter, as well as how the movement "ties itself together in passing from one milieu to another" (Deleuze and Guattari, 1988, p.313) across spaces. It also explores different energies to produce these qualities of rhythm, with an increasing intensity of the force of the gesture developing and then ending abruptly.

Summary

Within choreography with real-time video projections, space becomes complex. Four frames for movement emerge, including physical space, camera space, projection space and compositional space. The relationship between these spaces can be considered topological as they rely on continuous transformation of movement. This interrelation creates a dance composition with consideration of all the frames. Another choreographic element to creating dance work with multiple frames for movement is the consideration of rhythm.

References and Notes:

Gilles Deleuze Cinema 1 The Movement Image, trans Tomlinson and Habberjam (London: Continuum, 1986)

Gilles Deleuze and Felix Guattari A Thousand Plateaus Capitalism and Schizophrenia, trans Massumi (London: The Athlone Press, 1988)

Sherril Dodds Dance on Screen Genres and Media from Hollywood to Experimental Art (London: Palgrave Macmillan, 2001)

Susan Leigh Foster Reading Dancing: Bodies and Subjects in Contemporary American Dance (Berkeley: University of California, 1986)

Elizabeth Grosz Chaos, Territory, Art. Deleuze and the Framing of the Earth (New York: Rutgers University, 2001)

Brian Massumi Parables for the Virtual Movement, Affect, Sensation (Durham: Duke University, 2002)

Dan O'Sullivan and Tom Igoe Physical Computing (Boston: Thompson Course Technology, 2004)

S. Portanova and A. Piccirillo "Mereotopologies of Dance and Culture" A Topological Approach to Cultural Dynamics. Dec 2009, http://www.atacd.net/

Brian Rotman Changing Cultures: Cultures of Change A Topological Approach to Cultural Dynamics. University of Barcelona, 10-12 December 2009.

Ana Sanchez-Colberg A Choreological Documentation of Tanztheater from its Roots in Ausdruckstanz to the Present (Unpublished thesis London: Laban, 1992)

WALKINGTOOLS CONCEPTS: RETHINKING LOCATIVE MEDIA

Cicero Silva & Brett Stalbaum

Digital location is moving us towards a complex definition of what is locative. The article analyzes the implications of what is forming the structure of the politics of the space and the relation between the physical world and the representations that we have from it since the creation of maps and cartography. The article proposes a relation between content and location based on the subjective experience of the space.
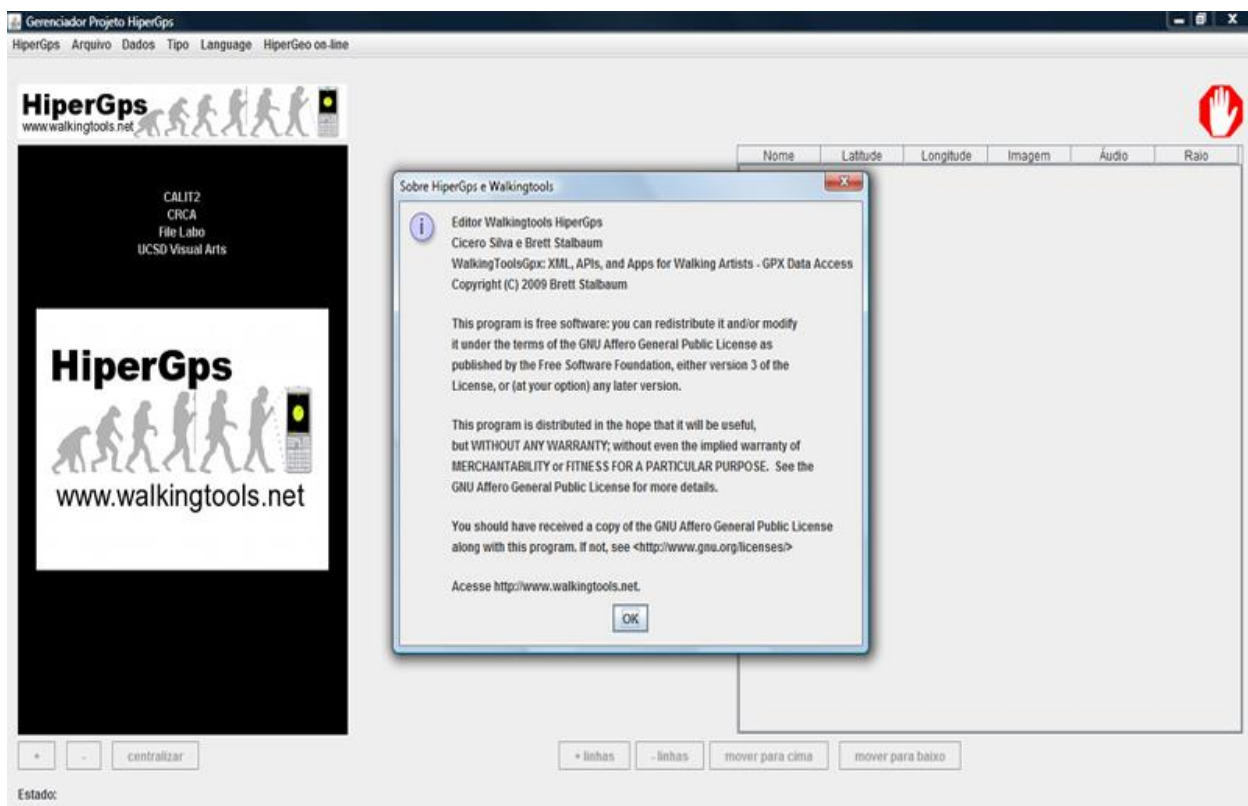
Walkingtools project by Brett Stalbaum and Cicero Inacio da Silva.

Wikipedia may be unreliable, nonauthoritative, and suffer systemic "hive mind" bias across a large number of topics, but for the purpose of capturing the mimetic zeitgeist of emerging discipline areas, its hivey, collaborative nature comes as close to producing reliability as we could hope for. This is further verified by the world's leading ontologist: the google internet search engine currently lists that wikipedia page as the number one hit for "locative media". Thus, it is safe to assume that the following definition is at authoritative in a collective sense:

"Locative Media are media of communication bound to a location. They are digital media applied to real places and thus triggering real social interactions." (http://en.wikipedia.org/wiki/Locative_media)

This we will refer to as the *normalized authorative* definition of locative media. Is this the limit of locative media, a meme that emerged only in the past ten years, somewhere in the confluence of ubiquitous computing and the significant influence of Marc Tuters and Karlis Kalnins? We will argue here that it is not, claiming that the normalized authoritative definition is so narrow that that the conceptual blind spots are are necessarily numerous. We speculate that exciting new territory and interesting unexplored possibilities exist, and will propose an agenda that seeks to move beyond the influential and important early phases of this new media. In the process, we will first parse some bits of the genealogy of the current definition, including examining some interesting rear garde polemics surrounding it. Following that, we will look at at narrative practice, examining its intersections with the normalized authoritive definition and examining some alternative practices. To that we will add some other speculative thoughts based on inspiration and frameworks drawn from the history, theory, and practice of conceptual art. In no place in this essay will we pretend to offer a comprehensive solution. Our goal is merely to define the problem and imply that there is work left to be done.

But before exploring these issues, let's wave the butterfly net and see what memes we can pull out of the air. Mapping and map hacking. Spatially tagged hypermedia and geo-annotation. Location aware story telling. Web 2.0 mashups using the Google Maps API. Neogeography. Google Earth competing with ArcGIS, spreading the software metaphor of geographic data layers from the professional realm into the consumer realm. Cast in virtual tourism, turn-by-turn in-dash GPS systems, and the waypoint merging with the vacation photo in the form of geotagging on websites like Flickr. Or even less exciting, consider the banal dream of wireless marketing: a consumer's mobile phone, fully aware of the user's geographic coordinates, chirps and delivers an electronic coupon for a nearby coffee shop, into which they stroll like a Pavlovian dog salivating a conditioned response to steamed milk. Certainly this is one of the most quotidian platitudes of recent ecommerce, but its activist other is also worth calling out. The latter stems from the cultural imagination of the sociologically engaged artist: the possibility of yet another technology or platform such as the Sony Portapak, community access television, the personal computer, and Webs 1.0 and 2.0 that will inevitably revolutionize the social as the means of production and distribution become more ever more democratically distributed. And of course, the artist imagines themselves standing there, producing their own narrative, a different content for the same systematic assumptions, hoping to stimulate a different interaction that the social engagement involved in purchasing a cup of coffee. Indeed, now 43 years since Nam June Paik supposedly used an early Portapak to videotape the Pope's visit to New York, we can see the art/activist ideological trope playing out in much the same way: the democratization of the content expressed through use of the medium allows potentially socially transformative media content to challenge dominant commercial content, therby "[T]riggering real social interactions" in competition with the social interactions already taking place in a consumer economy. These many tropes - mapping, geoannotation, geolocative services, and the implications of locative media for artistic agency within the domain of the social - can be said to explain how we so rapidly came to a relatively calcified understanding the new location aware media.

The activist trope may be a regularly occurring one in the artworld. Lev Manovich points to concerns with new technology's role in promoting "better democracy" as one of the ideological tropes typically accompanying the emergence of any new medium. We have our radio stations, they have theirs. We have our television stations, they have theirs. We have our web sites, they have theirs. Now we have our

own location aware media, and we hope to be as successful as the socially transformative agents of critical opposition who came before us.

Whether or not an optimism regarding the utopian or democratic potentialities of a new technology (or in this case, a new configuration of existing technologies) is a recurring trope (flowing from photography through Web2.0), concern with autonomy and opposition are *prima facie* apparent in the collective classification of locative media by contemporary artists and scholars. The social is the sign underlying its initial conception, with artists trying to be the balance against locative media's inverse revolutionary influences: dependence and compliance in a consumer culture. For example locative media wikipedia entry discusses a text by Ben Russell from 2004 in which he finely parses many of the social claims that can be made on behalf of the new area of practice, including public participation in the development and use of new technologies, the emergence of communities of interest, and the political issues of surveillance and control. In 2005 Galloway and Ward clearly enumerate the many political issues inherent in locative media: "Where does the technology originate? How is the project funded? Who gets to use these technologies to create cultural 'content' or artefacts? Who gets to set the rules of engagement? What are the power relations at play? What shape can resistance take?" In his essay "Locative Dystopia 2" Drew Hemment speculates a subtle and sophisticated answer to such questions, finding that "Locative Media's political moment might not be despite its complicity in mechanisms of domination but because of it, residing in the acceptance of the paradox and occupying the ambiguous space it creates, creating a site of resistance by working from the inside." Similar obsessions are clearly stated by most commentators, and in most artist project descriptions. But what is less examined is that by adopting a position of opposition, the artists enter a binary argument and adopt the very assumption that locative media technology is a communications technology. For artists the goals are different than the marketers: to be used in expository artistic expression and critical or sociological pedagogy seeking to mediate behavior as opposed to expository marketing and capitalist manipulation of the consumer. But locative media is too rarely seen as anything beyond this, for example as a medium with specific formal qualities that are poorly understood and in need of formal exploration.

Interestingly, the second google hit for locative media is an essay by one of the aforementioned founders of locative media, Marc Tuters. At first glance, the essay would seem to propose getting beyond current conceptions of locative media, inasmuch as its title is "Beyond Locative Media". But in fact, "Beyond Locative Media" is a defense against a rear garde action by prominent critics such as Coco Fusco, Jordan Crandall, Brain Holmes and Geert Lovink, who variously criticize the cartesian foundations of the medium itself, or the "decorative" artworks that function more like trade-show demos, or the unavoidable fact that like the internet, the Global Positioning System is a U.S. military technology with an irrevocable imperialist taint. These are all in fact completely reasonable (if sometimes predictable) critiques that locative media artists must answer. Tuters graciously accepts this, but responds via Frederic Jameson and Gilles Deleuze that artists must maintain an engagement with the media in order to have any hope of situating the contemporary subject in the context created by new technology, and to be in position to develop tools of resistance. Putting aside whether this is actually a direct response to any the specific critiques offered, we want to call attention to how the political trope simply rises again in Tuter's response to the political criticism of locative media as a political medium. Tuter's makes essentially Habermasian claims about the ability of locative media to communicate rational knowledge in the public sphere. Ester Polak's MILK project is highlighted in support of this, an evocative multimedia and geographic mapping of the path of milk en route from cow to cornflakes. In other words, the political moment of locative media is to be found in visualizations made possible by the "Internet of Things", thereby expanding the public's understanding (and presumably political response) of the structure and

distribution of material wealth. In other words, it is the locative variant of the profound cultural influence of documentary cinema on recent world history, or less sarcastically positively modeled on Donald Kuspit's severe critique of "Gallery Leftism" in which the artist calculates "to occupy a certain position, in the artworld... having a socio-political effect in the world".

What amazes us is the locative whirligig of assumption of political efficacy or some related role generally. Not that we consider this desire negatively in any way, on the contrary we sometimes tilt at the same windmill. Nor that we wish to actually analyze the actual political efficacy of any media. But we are concerned over the continual overreaching claims by artists that their work is a strong mediator of political opinions through the mechanism of the viewer consuming the artist's representations. The filmmaker Michael Moore may have provided the most notable recent example of what we are trying to get at here, in that his great films have not been politically transformative, functioning instead to reinforce already polarized points of view. The number of people who think that Bowling for Columbine (2002) is an anti-gun film is simply astounding! Well known political artist/prankster who sometimes goes by the name Mike Bonanno recently recounted a story from the Yes Men's "Yes Bush Can" bus tour in 2004 in which they performed "identity correction" by presenting themselves as members of the Bush Campaign team, complete with a campaign bus! At one stop, while giving one of their absurdly over the top pro-bush speeches, Mike noticed that almost everyone listening to them were either angry detractors or enthusiastic supporters. One man, a European, was able to read them for the politically provocative pranksters that they are, which in the final analysis was worrying to "Mike". Certainly there are at least contemporary questions about art's ability to communicate, let alone persuade.

Anti mapping

How are we to parse these? We may need to peer back a bit further, to seek a model that reveals a productive distinction that might extend the range and depth of locative media practices, breaking it from some of its present stasis.

A very similar pattern can be observed in the historical development "net art" practices back in the Web 1.0 1990's, a recognized period in computer art history that the present author was part of. The first wave of 1990's net art projects were interested in Web 1.0's abilities to represent information, identity, narrative, and function as a distribution channel for art practices focusing on online communication as the mechanism of individual creative expression and collective social engagement. The web was a communications channel for artists with a message and they used the media exactly as it was designed to be used. But it was not long before a smaller group of artists, mostly based in Europe, began to resist the more obvious approaches to and applications of the world wide web, questioning the formal aspects of underlying medium itself, treating the internet conceptually, hacking it, breaking it, and making it do things it was never intended to do.

Examples seem necessary at this point. We might point to artists like Judy Malloy, Abbe Don, Mark America and others associated in one way or another with digital story telling or hypertext story telling in the late 1980's and throughout the nineties. Following in a well laid tradition of hypermedia development instigated by Ted Nelson in the 1960s and 70s, these artists created stories and poetry delivered by emerging hypertext technologies that would finally crystalize in hypertext transfer protocol. In every sense, these accomplishments

For many of these artists, the web was a place to perform and to forge spaces of temporary autonomy, not a place to gaze at glowing messages or produce glowing messages to gaze at. And when we think of today's geospatial web in this context, we can see that notions more closely mapping to the former social applications of communications and representation abound, while notions of exploring the conceptual depth and unseen potentialities of the medium are rarer. We might define the two approaches as art *using neogeography and locative media* and art *of neogeography and locative media*.

There is a poorly understood relationship between data and location is obscured by our narcissism, our desire to see ourselves reflected in the high tech mirror. This is why we map. Many of the alternatives for locative can be revealed in widely misunderstood relationships between the virtual and the real. We can say that maps doesn't reveal us something, they command our view. The next step maybe is analyze why Google has decided on May of 2008 change his product policy from "Google and Maps" to "Google on Maps", showing us that they are aware of this turning point related to the power of the representation and the control of the spaces by virtual means, i.e. by the old but still valid concept of "map".

The issues are complex, and in the process of teasing the relationships we will also examine the currently accepted definition of "locative media" that seeks an escape into the the political by stimulating social interaction. What we need now is speculate routes of escape.

It is not the engagement with maps that is interesting, it is engaging with place.

GEO SOUND HELMETS: BREATH-CONTROLLED INSTALLATION

Cara-Ann Simpson, James Laird, Ben Landau & Eva Cheng

Geo Sound Helmets is an interactive and immersive installation of personal sound environments controlled by the participant's breath. *GSHelmets* are geologically inspired over-sized objects containing new technologies and soundscapes from specific geographic locations. The project explores aural geography, art/technology/audience collaboration, sensory interactivity, artist as facilitator, and audience as simultaneous composer/listener.
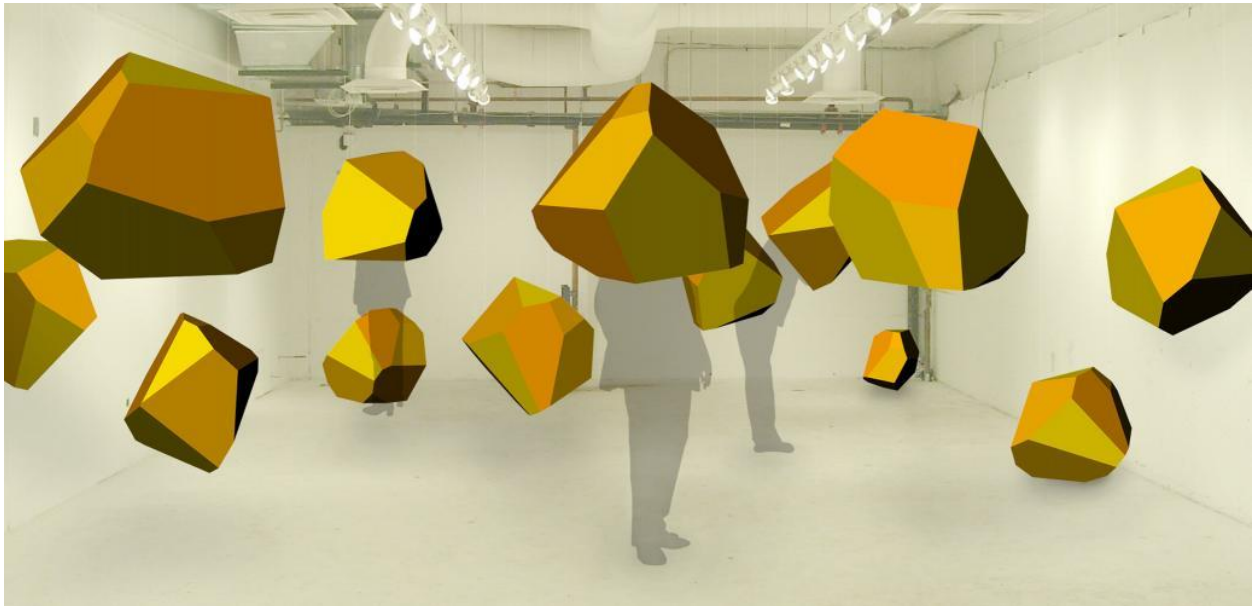
Fig 1. Geo Sound Helmets – installation concept, 2011, Ben Landau, digital image. © Ben Landau and Cara-Ann Simpson.

Fig 2. Geo Sound Helmets, 2011, Cara-Ann Simpson and Ben Landau, digital image. © Cara-Ann Simpson and Ben Landau.

Geo Sound Helmets (referred to as *GSHelmets* for brevity) is a series of immersive and interactive personal sound environments. *GSHelmets* are irregular shaped helmet-objects containing surround sound Vibrating Technology Speakers (VTS), motion detectors and breathing sensors. *GSHelmets* investigates how an individual's control over their biological impulse to breathe and move can be applied to drive an artistic and creative project. The project creates personalized sound worlds of geographically distant locations where the individual has control over the audio composition by changing their breathing patterns and shifting within the object.

The term 'geo', which is often used as a prefix to mean 'of or relating to the earth,' is important to the concepts behind *GSHelmets.* The sound recordings used as the basis for the compositions within *GSHelmets* are field recordings from specific physical locations, and as such they strongly relate to the use of 'geo' as geographical. Similarly, the design of the objects is influenced by the idea of 'geo' as geological and references the rock and gem cutting where strong planar surfaces exist in an asymmetrical geometric structure.

GSHelmets explores differing roles of artist and audience, interactive installation within public spaces, new technologies within art, and the importance of physicality. As an exhibition *GSHelmets* questions the validity of the author/artist as sole creator and suggests that the artist (and collaborative team) lays a foundation for the public to mould and manipulate into his or her own artwork or composition. Thus the artist's role within *GSHelmets* is that of facilitator, while the public becomes simultaneous composers and listeners. This paper will discuss *GSHelmets* in the context of other artists' works, cultural theory relating to social and environmental sounds and the listener, object design, and the technology involved.

The physical construction of the installation invites participants to within the space to put their head and shoulders inside different helmets where they will hear three-dimensional manipulated soundscapes from locations including (but not limited to) Australia, Singapore, Hong Kong and Canada. It is important to note that the helmet-objects are quite large and are not worn as helmets; rather, they are attached to existing architecture and act as isolation booths for the participant's head and shoulders (refer to Figure 1). Motion sensors built into the helmet enable the unit to be switched on automatically when a participant interacts with the object, and switched off when the participant leaves. Similarly, breath sensors (located between 10-30cm from the participant's mouth) detect changes in breathing patterns and react in close to real-time to manipulate the soundscapes according to the participant's breathing pattern. The sound is altered as the person breathes faster or slower, more deeply or more shallowly, or moves substantially within the helmet.

Human senses are intimated connected, and in particular our internal processes have large, subliminal effects. For example, during a heartbeat (which is quite noisy and causes the entire body to pulsate) proprioception and other senses are modified, leading us not to notice our body changing as we are accustomed to the phenomenon. Similarly, when we work in time with breathing it makes subtle changes more difficult to notice. We are, however, used to a number of natural bodily functions occurring when we breathe such as varying blood oxygen, which directly affects alertness. Using sound spatialization algorithms, in particular, is an interesting investigation into subconscious bodily changes and modifications of our senses as it will be relatively difficult for people to detect exactly how the soundscapes are being altered.

Bernhard Leitner's (b. 1938, Austria) project, *Headscapes* (2003), is designed to exist neurologically within the physical constraints of the listener's head and uses headphones for listening. [1] Leitner's

practice is dedicated to hearing sound through different parts of the body, and in *Headscapes* the listener's head becomes a new type of interior acoustic architecture where the experience is solitary and encompassing. [2] In many ways this work is the more extreme step taken from his body of work, where interior architecture and highly designed objects embrace the listener to cradle and enforce a particular type of listening that is specific to the human body.

Maryanne Amacher's (1938-2009) work, *City-Links* (an ongoing project from 1967) explores the sonic potential of urban environments. This work in particular, shows how site-specific sound can be transported to a different location. The work's outcome in the early 1970s for example, used a microphone installed in a window at the New England Fish Exchange in Boston (overlooking the ocean), which transmitted the live sound to Amacher's home studio. [3] This work engages with the idea of aural geography being used to portray 'absent locations' - where the site of the sound is removed from the audience's location. *GSHelmets* utilizes aural geography to portray the character and search for the keynote sounds (and frequencies) and find soundmarks (i.e. an aural landmark) that are unique to a site.

This idea of locations having unique aural identities is exemplified in *World Soundscape Project (WSP)*, initiated by R. Murray Schafer in the late 1960s from Simon Fraser University, Vancouver. The project recorded environmental sounds to understand the principles of aural geography (also known as acoustic ecology). The ultimate aim of the project was to examine the aural impact of humanity on the environment and to find solutions to balance the ecological soundscape. [4] The project also caused the notion of locations having unique aural identities through the detection of keynote sounds and soundmarks. [5] Schafer understood, however, that sounds are intrinsically different to the visual and can never be understood in the same way. [6] He suggested that "Seeing is analytical and reflective" and that sights could be described as nouns. [6] Conversely, Schafer suggested that sounds and "soundings" are active and generate actions, that "sound are verbs." [6]

GSHelmets' use of aural geography underpins another concept within the work - the exploration of the differing roles of the artist and participants or audience. The project questions the validity of the artist as sole creator and suggests that the artist lays a foundation for the public to mould and manipulate into his or her own artwork or composition. The artist's role within this project is that of facilitator, while the public become composers and listeners. Achim Wollscheid's (b. Germany) work, *missing recipient* (2004) uses the Akademie fur Tonkunst in Darmstadt to monitor movement on the stairs of the lobby, which in turn triggers corresponding moving lights. Environmental noise from the immediate surroundings is recorded, manipulated and played back in real-time. The work enables the audience (general public) to manipulate and interact with the installation on a very subtle level. [7] *Missing recipient* uses motion detectors, real-time audio effect and public interior spaces to investigate the physiological reaction of the audience that is determined by psychological decisions in a similar manner to *GSHelmets*.

This idea of the artist as facilitator and audience as composer is also apparent within the electromagnetic induction works by Christina Kubisch (b. 1948, Germany). Kubisch has worked with this technology since the late 1970s. Using wireless headphones Kubisch enables participants to wander freely around the space - whether this is within an art gallery, park or urban landscape. Kubisch suggests that the participant becomes a "mixer" who has control over the composition and duration of their experience. [8] The works work in a similar social manner to *GSHelmets* in that they isolate the individual participant to experience a personal soundworld that immerses and encompasses the participant in sound. *GSHelmets,* however, creates a small personal sound environment - an interior architecture within interior architecture. It isolates the participant to enable full immersion of an absent aural location where the actions of the individual determine the outcome and duration of the composition.

The act of isolating the participant occurs for three reasons, the first being to highlight the contemporary trend of deliberate isolation in public and social situations, such as individuals using headphones and mp3 players to listen to music on public transport or when exercising in public spaces. These examples draw on Michael Bull's suggestion that individuals feel the need to create personal sound environments in which they live daily. [9] With this in mind, *GSHelmets* acts to re-create a personal sound environment for the participant, and to then introduce the second reason for this isolation. Environmental sounds that individuals are deliberately wanting to block out are re-introduced to the participant in such a way that seeks out the beauty and subtle musicality of these locational soundscapes. This re-introduction of environmental noises also facilitates the ability to listen and understand the aural geography of a location that an individual may not have visited. For example, a listener from rural Australia could listen to a cityscape of the bustling metropolis of Hong Kong.

These ideas draw on theories posited by philosopher Roland Barthes and sound artist Pauline Oliveros. In 1984 Barthes proposed that hearing was physiological, whilst listening was psychological, suggesting a formal separation between the two. [10] *GSHelmets* works on both levels, where the subtle physiological changes of the body (and of hearing) can alter the audio, thus creating a psychological awareness of listening to the soundscapes and looking to deliberately alter the outcome. Pauline Oliveros suggested a new form of listening, which she labeled "deep listening" where the listener is open to the entire field of sound - a deliberate psychological decision to incorporate the surrounding environmental soundscapes. [11] This form of intense listening to the audible environment as a holistic guide reveals the situation specific nature of sound that depends not only on a particular site, but also on circumstantial time in which the field of sound was deeply listened. In this way the soundscapes presented in *GSHelmets* are not only locational to the aural geography but to the times and dates of the recordings as well.

The design of the helmet-objects is particularly important to the philosophy of *GSHelmets* as the comfort, both physiological and psychological, of the participant is paramount. The use of VTS technology allows the helmets to be slim-line and lightweight, where the interior of the object is seamlessly integrated into a singular component. The design of the installation objects is informed by their intended use, the term 'geo,' and the idea of the group of helmets acting together to form an installation. The helmet's use relies on the inviting nature of form and promise of sound permeating within. The functionality of the helmet relies on the positioning of the sensors around the inside edge of the helmet, which need to be aligned with the users face, in order for them to affect the audio output.

The angled form of the helmets references the term 'geo'. An initial exploration of geo revealed designs that represented earth itself in a geocentric view. This centered on geodesic domes which were attractive for their even form and integral strength. However, a more powerful metaphor was found in geological nuggets. The irregular angled forms reference crystal growth, while the sound bites are compared to precious stones captured from the earth. The angled forms are offset to form a skin within the helmets to give the idea of a geo interior.

The group of helmets forms an installation in a gallery space or thoroughfare. They therefore need to make an impact in the space. The modular and irregularly angled silhouettes form a stark contrast to clean walls, and regular, expected interiors. The bright and complementary tones reference precious or unusual geological finds, and again stand out in the monotone environment such as the gallery space (refer to Figure 2). The specific design of the helmet also impacts upon the layout of the sensors and components within the object, which have precise requirements for functionality.

The technical components of *GSHelmets* are comprised of a breath (humidity sensor), and an InfraRed (IR) LED sensor for detection of the participant, which are interfaced to an Arduino microcontroller connected to a computer running Max/MSP. Breathing is sensed by detecting humidity and since exhaled air is close to 100% relative humidity, breath can be easily detected. In order to avoid processing the ambient humidity changes as a signal (10-70% is common), the project uses differentiators to extract only the short-term, time-varying component of the humidity signal. This signal will decrease if the ambient humidity is high (>80%). The humidity sensor used for *GSHelmets* has a relatively slow response time; thus, the derivative of the derivative is taken (chaining two differentiators of different speeds) to obtain a strong signal.

The presence of the participant is sensed with an IR LED and sensor (a bright LED is used). The infrared receiver is designed for conventional use in TV remotes, where the IR light is modulated (turned off and on) at 38kHz to avoid interference from background and outside light. The 38kHz signal is turned on and off a few hundred times a second to ensure that the sensor is not overloaded; this compensates for background light levels by turning the receiver sensitivity down (automatic gain control).

Both sensors are driven and read using an Arduino microcontroller. The firmware has been modified from the default standard to enable the project to drive the LED at 38kHz, whereas standard Arduino timers are limited to <25kHz. Modification was required with the computer serial interface, as the default Arduino serial routines are not compatible with the 38kHz signal generation. This has resulted in more complex software, but is compensated by straightforward hardware as specialized 38kHz circuitry is not required. The IR receiver is directly interfaced to the Arduino digital inputs and drives a test LED, while the humidity sensor is interfaced to analog inputs. The inputs are converted to numbers and sent to the computer over a serial port.

Max/MSP was used for the prototype of the installation, reading from the USB serial port and performing the double-differentiator filtering as described above. Each differentiator stage subtracts a delayed version of the signal from the current signal, which calculates how much the signal has varied in that time. A moving-average smoothing filter occurs before and after each differentiator. The first differentiator is reasonably slow (1000ms difference), and serves predominantly to remove the ambient humidity signal. The second differentiator is faster at around 200ms and detects the breathing cycle, rejecting the ~5 second slower components of the sensor response. Together, these filters work effectively to reject the large changes in the input signal that occur while someone moves close to or away from the sensor.

The 'head' sensor is used to gate the audio on or off and uses a slow fade for a perceptually smooth transition. Positive humidity peaks (exhalations) control an effect applied to the signal. The humidity signal is tied to a wet/dry reverb mix, where the filter output is most apparent at maximum humidity. This generates a time-varying effect controlled by the user's breathing, and is intended to permit perceptual manipulation. Surround sound spatialization in the helmets have initially been produced through amplitude panning and phase decorrelation, with a view to implementing state-of-the-art near-field 3D sound spatialization algorithms**.**

Geo Sound Helmets is an exciting project that will continue to evolve and develop as further geographical compositions are added to the installation. The work enables a diverse audience to interact and become composers and creators, while the artist and collaborative team facilitate. By isolating individual's to re-introduce them to the audible environment surrounding them and in absent locations, *GSHelmets* questions our societal trends and how we interact with each other, as well as our environment.

The technology involved in the project demonstrates the validity of incorporating new and evolving technologies into creative projects that can enrich the experience of the audience.

References and Notes:

1. *B. Leitner's Web Site, www.bernhardleitner.at/ (accessed March 20, 2011).*
2. *B. LaBelle, Background Noise: Perspectives on Sound Art (New York: Continuum Publishing Group, 2007), 174-176.*
3. *A. Licht, "Maryanne Amacher: Expressway to Your Skull," in The Wire: Adventures in Modern Music, March, 1999, www.thewire.co.uk/articles/3220/ (accessed April 25, 2011).*
4. *H. Westerkamp, "The World Soundscape Project," The Soundscape Newsletter,August, 1991, http://wfae.proscenia.net/library/articles/westerkamp_world.pdf(accessed May 05, 2011).*
5. *R. Murray Schafer, The Soundscape (Rochester, VT: Destiny Books, 1994), 10.*
6. *Schafer, R. Murray, quoted in B. LaBelle, Background Noise: Perspectives on Sound Art (New York: Continuum Publishing Group, 2007), 195.*
7. *Selektion's official Web Site, "Achim Wollschied," 2009, www.selektion.com/members/wollscheid/default.htm (accessed February 15, 2011).*
8. *Christina Kubisch's Web Site, www.christinakubisch.de/ (accessed October 8, 2010).*
9. *M. Bull, "No Dead Air! The iPod and the Culture of Mobile Listening," in Leisure Studies 24, no. 4 (2005): 343-355.*
10. *Barthes, R., quoted in C. Cox and D. Warner, eds., Audio Culture (New York: Continuum Publishing Group, 2007).*
11. *P. Oliveros, "Deep Listening," Pauline Oliveros' Web Site, April 4, 1998, http://paulineoliveros.us/site/node/47 (accessed May 20, 2011).*

BETAVILLE: THE VIEW FROM NEW BROOKLYN

Carl Skelton

The Betaville project has matured from a software art experiment into a vehicle of creative collaboration and exchange: a tool in planning and architecture studios, and a *fully public medium* for concept development and advocacy in the context of local art and urbanism projects. In this paper, one of Betaville's founding citizens will present some of the first results from Betaville's implementations in the field.

Fig. 1 Inside Betaville, lower Manhattan: Concept for a mixed-use development that would permit/thrive on public access to the waterfront.
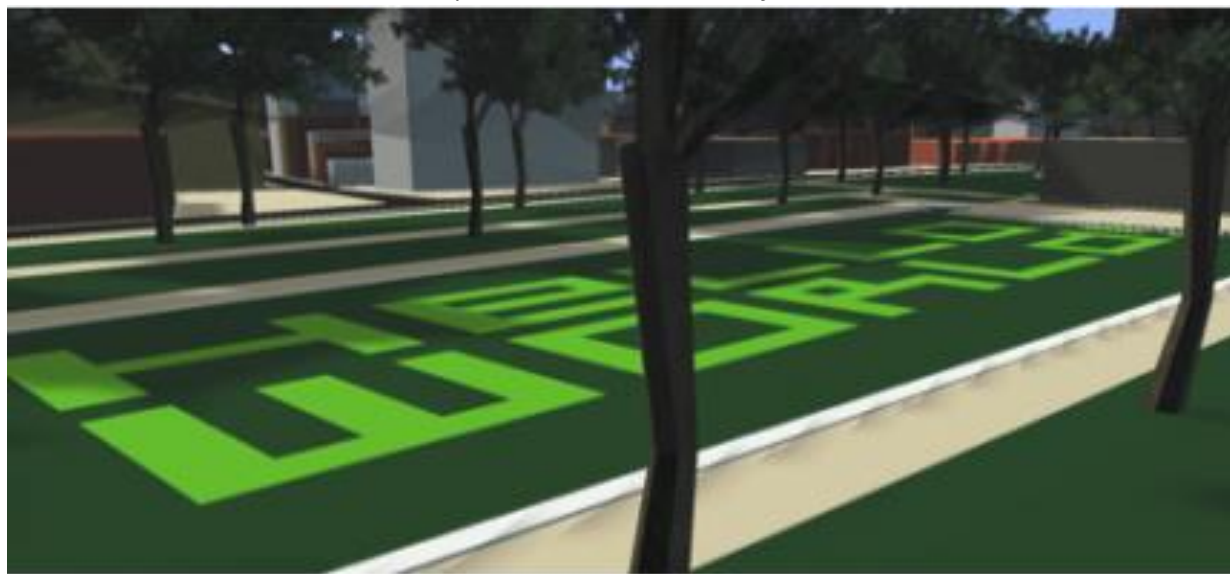
Fig. 2 Concept for artificial turf playing field, Cadman Plaza Park, Brooklyn.

Betaville: The view from New Brooklyn

Betaville is a massively participatory editable virtual world, designed to support collaborative development of new ideas for the built environment, from public art installations to comprehensive plans for urban design and development. Betaville is built to provide a shared environment for deeper, broader, and more effective public participation in the elaboration of new ideas, by providing an online "mirror world" of a particular building, place, neighborhood, or district, in a visual language that is common to artists, architects, and other professionals, but also to the rest of the community. Ideas for changes can be uploaded from most modeling applications from Google Sketchup to Autodesk Maya into the world for discussion through built-in commenting mechanisms, and each proposal can be iteratively matured over weeks and months, as necessary.

Betaville's driving motivation was to provide a way to upgrade public art and urban planning/design: could public work, or works, be developed further before major investments are undertaken, by more appropriately public means? The infrastructure and tools had accrued in society at large by happenstance, could we bring them together to get public culture more developed? If tools needed building, the work that had gone into building creative programs in engineering schools ought to be helpful… after all, the best precedent was open-source software development, and we had lots of friends with skills around, looking for big yummy problems to solve. Might there be an opportunity for another, broader approach to Douglas Engelbart's agenda for the augmentation of human intellect at creative levels, in regard to the built environment? The common language of 3D fly-through, with embedded links to full background information, and a complete record of the process to date, combined with the competence to leverage public data, verifiable dimensions, low enough overhead to permit implementation before and between formal proposal processes, or processes initiated at smaller scales than the multi-billion.

The precedent had been set in software development: over time, ad-hoc communities of interest, through mixes of formal and informal kibitzing by amateurs, noobs, self-taught anarchists, academics, and bored support staff gradually build consensus around mature design solutions to complex problems: GNU, Apache… Why not try to port this to local art, design, development issues? Ideally, such an environment could be set up ad-hoc at any scale, from an undergraduate or even high school studio course to an architect's office, a city agency, or a community group; development of the core tools and specialized extensions would be ongoing through a subset of the global community, while creative coalitions might form at a local level between stakeholder groups with a tradition of rivalry or antagonism, within the hortus conclusus of a virtual variant of the world in play, capable of supporting any number of ideas and of tolerating any number of re-combinations and refinements until a consensus emerges around a mature solution, or a viable distribution of distinct zones.

Constant's New Babylon, his *Autre Ville Pour Une Autre Vie*, might yet meet David Gelernter's *Virtual Worlds* as day-to-day lived public space, with an understanding that the built environment both expresses and determines the "terms of use" of citizenship, and that therefore debates about public space are as fundamental as any other public debates, for which the development of access and effective (read-write) literacy are both human rights and socio-cultural "capital".

The Betaville project was launched as a joint initiative of the Brooklyn Experimental Media Center (BxmC) of New York University's Polytechnic Institute and the Media2Culture (M2C) Institute for Applied

Media Technology of the University of Applied Sciences of Bremen in July 2008, at a symposium for International Urban Media hosted by M2C in Bremen.

I had arrived in Bremen with a loose knot of what seemed like incommensurable desires as an artist with an interest in the public realm as a creative field at three levels: As an artist, making unfamiliar concepts (proposals) for new public works clearly understandable in their form and relationship to context not just to juries and panels, but also to neighbors in good enough time to provide opportunities to develop concepts further through open consultation with people whose knowledge of contemporary art, but whose informally-acquired knowledge might crucially improve the work, and whose standing as a citizen of the district ought, in any honest definition of the public realm, give them a say in plans to alter the physical world whose alterations are intended to change the environment in which they live. As a citizen sensitive to the effects and side-effects of public space, to explore the possibilities for an augmentation of collective creative capacity, analogous to Engelbart's vision for the augmentation of human intellect through real-time shared computing environments with graphical interfaces, or a post-Beuys "very social sculpture".

If the ideation and experimental concept development stages of urban art, design and development can be available to the breadth of people, and on the kinds of terms, that have characterized open source software development, might it not be possible to arrive at analogous levels of imaginative consensus and quality over time? If that many can and will commit that much to SimCity and Google Earth and Linux, why not open up the question of real streets and neighborhoods, to a similarly rich mix of academics, creative professionals, and bootstrapping self-teachers? As the founding director of creative programs within an engineering school, serving a complex mix of artists, designers, and programmers from a hyper-diverse mix of backgrounds, with a weirdly rich mix of perspectives and ambitions, might it be possible to build a set of software tools as a shared resource whose code base would be open and available for alteration on the same terms for us and others with similar interests at a global scale? In "media" terms, it was a simple twist on the old McLuhanism: if the medium is the message, we might simply make the medium itself *plastic,* amenable to both local and global change.

While New York City is a major world capital in many domains, it is an astoundingly small town for computer science and engineering, and particularly so for research and development cross-overs between the cultural, civil, and technology sectors. BxmC is a fledgling enterprise, and the opportunity to partner intensively with a like-minded group in Bremen has been a precious boon. It should be noted that BxmC and M2C are exceptionally compatible hybrid enterprises, offering creative programs with an orientation to the public and civil sectors, within engineering schools which are themselves set within comprehensive local academic networks. Together, we have been able to build Betaville through what might be considered a complete avant-garde cycle: from the kind of speculative-exploratory "experiment" that properly characterizes cultural innovation, to the due diligence of design and technical development of an "experimental" prototype, to a responsibly deployable infrastructure for general use in situations where third parties are at stake: a public space, a neighborhood, a city.

As we have moved further into realms where the work is not only taken at face value, but begins to risk long-term impacts, the burdens of due diligence have increased, and extra-curatorial pressures on the work's content have arisen as not only subject matter, but the actual purpose of the work, requiring attention sustained beyond the festival or conference, and local engagement beyond the limits of itinerant art practices… a level of participation in which the *public* is treated as not just an audience, but a constituency. Likewise, the full engagement of other professions (planners, architects, politicians) requires a range of approaches outside the scope of even "relational" practices within contemporary art norms.

As a work of collaborative art, Betaville makes visible and performs a new scenario, and stages the experience of distributed creative transformation of built worlds for the people who "go there". As an open software project, it offers a set of tools which must be robust, scalable, and non-destructive in interacting with the contemporary realpolitik of urban evolution and transformation. First, we could ask ourselves as citizen-artists, What Would We Do If We Were For Real? Then, we had to ask ourselves as citizen-engineers, What Would This Do To Us If It Were For Real?

BxmC and M2C can span these gaps, at the price of some complicated logistics and VERY promiscuous interdisciplinary collaboration: art, engineering, politics, roughly in that order, bearing in mind that graphical computing skills, hardware, and networks have developed well beyond the traditional perimeter of authority-empowerment in these *incompletely public* domains.

The Brooklyn team has led the basic server and web client technical development, and certain instrumentation functions for assessment purposes. We worked up a first 3D "base model" of terrain and buildings, and experimented with deployments in downtown Manhattan and Brooklyn, while the Bremen group led on alternative clients, polling systems, and the ThinkBETA consortium.

In fact, the two groups have worked together quite closely, through a coordinated program of integrated research, project courses, and thesis work, with regular exchange of students and researchers in residence. The first public demonstration of the Betaville suite was given at the Municipal Art Society's first Summit for the Future of New York City in October of 2010, and a follow-up presentation/announcement is scheduled for October 2011. What follows is a partial outline of a selection of the developments on the Brooklyn side.

The research prototype and test flights have proven the robustness of the platform, and collaboration with experienced partners provides some necessary assurance that we won't actually cause damage by jumping into situations we don't know well enough. At the time of writing, several full deployments are planned or underway out of Brooklyn:

- International University Haiti/James Jay Dudley Luce foundation, Architects for Humanity
- Urban Assembly Gateway School
- ReGenerations, New York Hall of Science
- Betaville on the Bowery, New Museum
- Downtown Brooklyn Commons

Consider this last item, in a bit more detail: by the spring of 2009, we had a mock-up and a rough prototype in hand. As the Polytechnic strove to establish an "urban" initiative, I was asked to present the project to Joe Chan, president of the Downtown Brooklyn Partnership (DBP), a local development corporation for the area around NYU Polytechnic… the kind of institutional diplomatic errand that typically leads (at best) nowhere, and (at worst) to many more before petering out. Joe responded in particular to a design concept for the extension of an auditorium down to the basement level, and then out as an amphitheater scooped from the MetroTech Plaza. "Like the Pompidou!" he exclaimed. "What the…?" I thought. Joe proposed the idea of using Betaville as a public vehicle for an open process about the issue of "making sense" of the odd disconnected patchwork of green spaces in downtown Brooklyn, initially through an ideas quasi-competition to be run in Betaville, including the area colleges with architecture and/or planning programs: City College of New York (planning), New York City College of Technology (Architecture), Pratt Institute (Planning), and NYU's Polytechnic (Digital Media).

As it became clear that a one-semester design studio couldn't really accommodate both familiarization with the Betaville environment AND serious conceptual work, we opted to run Poly's participation through Betaville, as one new vehicle/approach. The program was defined by the DBP as "Downtown Brooklyn Commons", an area centered on the Cadman Plaza park, bounded by the Brooklyn waterfront to the north and west, and the Fulton Mall commercial district to the south and east: a perfect storm of urban art, design, and planning conundra, from parkland isolated and bisected by commuter pass-throughs to extreme socio-economic diversity, large-scale redevelopment projects in the teeth of unstable economic conditions, and open questions about future plans for adjacent lands, both private and public.

After a bit of background research, and a bit of discreet consultation with a few local experts and stakeholders with deep roots but without local partisan grudges, we opted for a very broad range of propositions, from park quasi-art installations that could be used to teach math or keep score by local schools using the park as their playing field, to speculative concepts for art/infrastructure hybrids, elevated linear parks, a stadium project as a lever to bankroll healing of the interface between local/pedestrian/bike traffic and regional commuters (Bring Back the Dodgers, AND Save Lives!), some straight-up public art installations that might be visible from Google Earth, if not outer space… and a handy comparative example of a similar problem in downtown Bremen, the Rembertiring, where the similar physical spaces contrasted usefully with the very different regulatory, planning, and cultural forces at play. At the presentation, in Brooklyn's borough hall, a latent coalition crystallized around one particular concept, the adaptive upgrade of a semi-utilized park building very close to the pedestrian access to and from the Brooklyn Bridge boardwalk: a visitors' center and "Open Museum", which would provide orientation to the district in three distinct modes:

- historical~ (phone apps for self-guided tours through historical points of interest, AR exhibitions of buildings and infrastructure that are no longer there, or were designed but never built at all);
- contemporary~ the district as an open-air gallery, augmented by new works of art to be experienced by the blending of the direct experience of the district with audio and graphical media supplied through portable devices, or simple downloads to the equipment visitors are already carrying as a matter of course;
- future~ again, through mobile multimedia applications and mobile web-based tools, but here a program built around a Betaville of downtown Brooklyn, populated and created/re-imagined over time by the full spectrum of visitors, workers, students, and citizens of Brooklyn's downtown.

This strange blending of modes and mandates struck a chord with advocates, planners, and local political representatives, and attracted more interest from likely collaborators within area institutions, all at once. In effect, a sensitively calibrated demonstration had opened the door to a full engagement. We are now working to follow through on this concept, with a full spectrum of participation. A series of formal announcements will be made over the course of the next few months.

At the very least, we can "augment" the current practices~ town hall, charrette, call for proposals… at best, we may be able to seed an effective local virtual avant-garde, working with locally adapted mash-ups of the tools and practices conventionally associated with art, engineering, and politics, making the most of direct access to a global network of local, virtual, and ever-expanding vanguards. Virtualization of experimental ideation for the built environment makes it possible to combine the best of both worlds: opening up of the conceptual range traditionally associated with science fiction and revolutions, while providing for a level of inclusiveness, intelligibility, plasticity, due diligence, and a collective attention span beyond the research grant term, the five-year plan, or the four-year election cycle.

Betaville has already demonstrated that the development of a fully functional open-source software infrastructure for such applications is feasible, and that therefore the prospect of a citizen-built virtual city, rather than a commercial virtual world whose politics can never transcend "house rules", is also feasible in the near term. Betaville itself may yet suffer a crisis of legitimacy as a work of 'extremely relational contemporary art' as it becomes a reliable medium, a 'public work' of infrastructure… the good news is that we will now be able to fully exploit its potential as a medium, for new works and forms of mutually augmenting imagination, iteration, and development. That will suit us fine. After all, we're not just the principal investigators, research assistants, partners, participants... We're also Betaville's first constituents. In the meantime, everyone is welcome in our world, or to build your own with the tools already available for download via Betaville.net.

Every Living City is in Beta. Let's Play.

References and Notes:

REFERENCES

Engelbart, Douglas (1962). Augmenting Human Intellect: A Conceptual Framework Prepared for: DIRECTOR OF INFORMATION SCIENCES AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON 25, D.C. CONTRACT AF49(638)-1024 SRI Project No. 35781096

Gelernter, David (1992). Mirror Worlds: or, The Day Software Puts the Universe in a Shoebox… How It Will Happen And What It Will MeanOxford U.P.

McLuhan, Marshall (1964). Understanding Media: The Extensions of ManMcGraw Hill, NY, 1964

Nieuwenhuys, Constant (1959). Une Autre Ville Pour Une Autre VieInternationale Situationniste No. 3 Paris

LINKS

http://regeneration.nysci.org/

http://bxmc.poly.edu/betaville

http://betaville.net

DATA DISINFORMATION: DATA MANIPULATION AND IMAGEMAKING

Helen Sloan

Written in parallel with the exhibition *Uncontainable: Broken Stillness* and the panel *Data Disinformation* this paper examines the ways in which artists are diversifying the role of imagemaking through data manipulation, bespoke software and hacking.

The relationship between technology and speed has been closely associated with the development of progressive technology in the 20th Century and now in this century with the ubiquity of personal computers, mobile devices and networks with rapidly increasing capability. It has been an expectation that machines will work faster and more seamlessly in the service of making society more flexible and agile. Unless procedures go wrong in the mainstream, data transfer, manipulation and creation are rarely questioned. Notably Paul Virilio commented on these developments observing that speed is so much a part of our engagement with society that we are dependent on it while apprehensive or even fearful that the technology of speed may break, stop or cause accident and disaster. [1]

Concurrently with these developments there is a global economic turning point, dwindling planetary resources and a shift in the ecology of practices from the individual to the collective - these socio-economic changes offer both positive and negative positions for creative and artistic practice in the scheme of broader societal change.

The exhibition *Uncontainable: Broken Stillness* and the panel discussion *Data Disinformation* implicitly engage with these current broader societal issues through a deliberate investigation into the relationship between new creative practices and older analogue pursuits such as painting and pre-digital photography – the exhibition suggests that the temptation to discard art history in the digital era may be misguided.

Uncontainable: Broken Stillness is a celebration of an artist's signature work and style. The exhibition does not suggest an alternative for shared working but that there is space for individual practice to make a contribution. The pioneering work of imagemakers such as John Heartfield [2] and later Peter Kennard [3] left no doubt that their influence on imagemaking of the time and their political context was extensive. Richard Hamilton [4] and Victor Burgin [5] among others appear to have used their predecessors' techniques. The rise of photoshop and other image manipulation packages introduced a tacit acceptance that this form of imagemaking was no longer particular to the indvidual imagemaker but a technical enhancement of the photographic process accessible to all. In some respects this was a very positive development for users, but as packages were readily available it was and now is often too easy to spot general characteristics of Photoshop, Director, Flash and Eyecon for example that have been imposed on any unique image.

The artists in both the panel discussion and the exhibition at ISEA were selected for their use of digital techniques embedded in the development of a visual language begun in earlier forms of image-making. The artists are using the unique value of technology to increase the spectrum of markmaking,landscape,

media and gesture. Their work involving bespoke programs, hacked packages and mediated imagery enhances the role of the image both aesthetically and politically at the hands of the artist.

Tim Head, a forerunner of the contemporary trend towards fusion of art and science and producer of politically driven imagery and installation, strips data back to the material of the OS and the screen with a program written in C that randomly generates lines of colour (in some of his works randomly generated colours are produced pixel by pixel) on screen in his conceptual works such as *Laughing Cavalier* shown in the exhibition. Peter Hardie, a pioneer in computer animation, has dedicated years to studying the properties of water and the representation of its movement in animation. His *Ripple* series shown in the exhibition combines his interest in impressionist painting with animation. This work strives to find marks and techniques that can only be produced through computer programming. His study of water and light has combined mathematics,
the study of molecular movement and light with the observational techniques of the impressionists. It is this combination that has enabled the artist to extend the range of techniques possible for describing movement of water and reflection of light on it.

Susan Collins has worked since the 1980s in computer and electronic arts and is recognised as a leading UK artist in this area of practice. *Glenlandia*, a contemporary investigation into landscape art, is an archive of images gathered from pointing a webcam at Loch Faskally. The work shows images on screen generated by changing pixel by pixel over approximately 21 hours in a day. This piece provides a timeframe as well as an in-depth study of a single landscape. Presented on the screen in landscape format the artist introduces representation of time showing simultaneously day and night views of the same scene studied and recorded over two years. She has produced a series of archives in the UK and internationally that explore the subtleties of the landscape tradition. boredomresearch continue the landscape theme using Processing to develop artificial life for their playful diptych *Lost Calls of Cloud Mountain Whirligigs*. The work generates fictional beings (Whirligigs) set in an environment combining landscape with mechanical technology. Each viewer experiences the piece differently as the Whirligigs exhibit individually generated behaviours and lifespan. boredomresearch rely on the generation of unique images and behaviours so that no two people will see exactly the same image and are interested in the way that viewers engage with landscape and the ability of digital media to develop fictional fantastic landscapes for the viewer to engage with.

Sigune Hamann, photographer and video-maker, uses analogue 35mm stills photography adding movement to the image by shooting a still film in one take. The resultant *film-strip (Whitehall 9.12.10)* made at the Student Protests in December 2010 stunningly combines moving image, panoramic photography and painterly gesture. This work develops her interest in the role of the camera and subject in standard narrative in film and photography and the application of digital techniques to old media to question and subvert these narratives. For example the student protests were a mix of dreary, dynamic and subversive atmospheres and yet here film-strip shows a beautiful painterly scene that seems removed from the reality of the subject. David Cotterrell's work also subverts context by
challenging our understanding of war through media images. His recent body of work assembled from footage taken during his residency in Helmand Province, Afghanistan, deliberately looks at images of war that represent the waiting for action rather than the much publicized activity of war. *Green Room* is a video loop showing the anticipation of the arrival of casualties to the medical room in Helmand. Treated in post production and heavily mediated, *Green Room* creates a sumptuous image that enhances anticipation of action – a very different tableau from media and cinematic representations of casualties of war.

Susan Sloan has researched extensively the use of motion capture in animation. This technique most associated with gaming and cinema special effects typically focuses on the production of stylised and standardised movements of characters. These are achieved through a post production 'cleaning' process erasing glitches in movement. Through the inclusion of individual signature gesture and character in her subjects, *Mary and Annie*, Susan Sloan develops the language of portraiture and likeness through image and movement. Her short loop of each character provides an image that occupies a place somewhere between a painting and an animation.

Relevant to this discussion is the most recent work of Terry Flaxton with whom SCAN worked in 2010. His pioneering research into the production of HD moving images and changing audience engagement (due to a different physiological response to the one with SD images) has called him to question the way in which HD images should be produced - research shows that audiences remain with HD much longer than SD. His new images are rich, often appearing to be slowed down or completely still to compensate for this change in engagement. [6]

Whilst the artists in *Uncontainable: Broken Stillness* suggest movement or animation, these movements are understated falling in between the language of moving and still image. It is the power of the subtle suggestion of movement, the place the work occupies in art historical, cinematic and media representation and the role the pieces play in the development of image-making that is the focus of the exhibition.

References and Notes:

1. *Paul Virilio, The Aesthetics of Disappearance, trans. Philip Beitchman (Los Angeles, CA: Semiotext(e), 1991).*
2. *More information on John Heartfield can be found in David Evans, John Heartfield: AIZ/VI 1930-38 (New York: Kent Fine Arts, 1992).*
3. *More information on Peter Kennard can be found at his website http://www.peterkennard.com (accessed June 1, 2012).*
4. *For general background to Richard Hamilton can be found at http://moma.org/collection/artist.php?artist_id=2481 (accessed June 1, 2012).*
5. *Bibliography of Victor Burgin is at http://www.egs.edu/faculty/victor-burgin/bibliography/ and discussion of his photomontage is in David Evans, Appropriation (Cambridge, MA: The MIT Press, 2009).*
6. *More information on Terry Flaxton can be found at http://www.flaxton.btinternet.co.uk/ (accessed June 1, 2012).*

CLEANING AND CHARACTER IN MOTION CAPTURE PORTRAITS

Susan Sloan

This recent series of work focuses on the portrait, explored through the medium of animation, using Motion Capture data as the core material. Analogous to traditional notions of portraiture, drawn, painted, filmed, photographed or sculpted, at the core of these animations is a representation of the sitter.
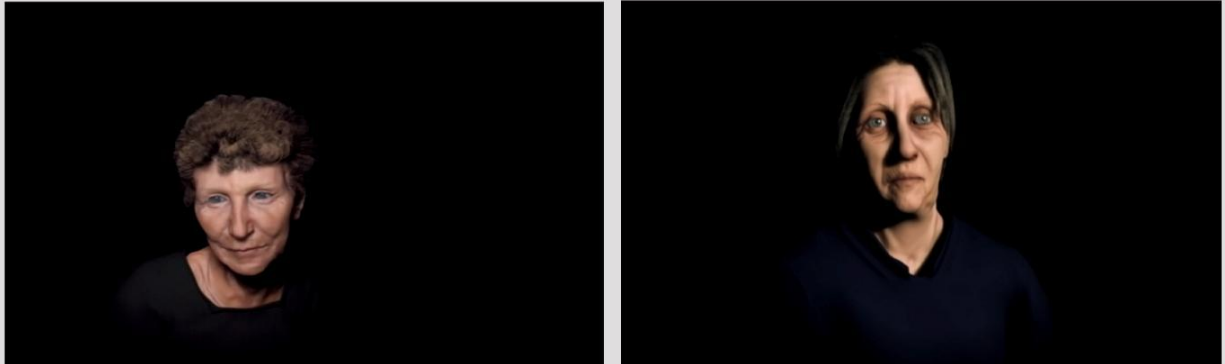
Mary, Annie. Uncontainable: Broken Stillness, 2011.

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Framed as a single shot and composed around the head and torso of the sitter, the works point to historical portraiture traditions, although in the animated form it is simple gestures and movements that give insight to the sitter and who they are.

Working with people I know or meet by chance, I am attempting to capture a sense of stillness and perhaps the ordinary. Using Motion Capture technology I record the subjects, essentially just sitting, being themselves, albeit under the gaze of 10 cameras. There is no performance as such and no narrative unfolds in these works but rather, I am fond of the idea that time slows down as the viewer spends time watching the sitter 'sitting'.

The use of Motion Capture has been developing in many areas such as entertainment, military, medical and engineering fields. It is a process that records motion data from a moving subject in 3 dimensions. There are many Mocap systems in use and they fall into 3 main areas, mechanical, optical and magnetic. In essence, they all track markers which are fixed to the body (animal/human) at key pivot and rotation points and produce a set of 3D co-ordinates and their rotations and trajectories over the period of the movement sequence. This tracking data is fed back to a software system and applied to a virtual skeleton. In the entertainment industry such as Games and Film and within the Performing Arts this is often called Performance Capture. The performer and the data recorded will drive the virtual skeleton. In these cases the virtual skeleton is often referred to as a puppet. In the Film and Games industry, the skeleton will, in turn drive a 3D character either in real time as in in-game animation or 'cut scenes' where the Mocap will be added to and polished off as a finished performance for screen.

In the field of gait analysis however, it is often not a performance that is being captured but normal and pathological function in the study of animal and human walk cycles for Orthopaedics and Physical-Therapy

Motion Capture portraiture lies somewhere in between these two areas of motion study. I am attempting to record a gestural stance, or an awkward tilt of the head and yet I am also drawing from traditions of painting and sculpture in the representation and interpretation of that data .Whilst the portrait is entirely constructed in 3D modelling software the motion of the subject is recorded from real life. The works become a record and an interpretation at the same time. The relationship between the recorded data and manually animated and sculpted forms becomes significant. The portraits are not just an interpretation of the external visible characteristics of the sitter but also a document of their spatial co-ordinates, their motion and very often their emotions.

I am interested in the notion that Mocap is a document of existence in the same way that a photograph or a piece of video footage is. It is not one moment or an event captured in time but a document of an individual's movement and identity removed from a specific time and place.

Within the Games industry individual characteristics in Mocap are often 'cleaned up' or removed from the motion capture data in the production of generic motion sequences such as run cycles, 'idles', 'sneak' cycles or 'punches'. This is done primarily to remove unwanted artifacts from the data such as glitches and ticks but it can be the 'personality' of the performer and their gesture that is removed or binned in favour of a more generic stance or 'readable' action pose.

Having studied my own motion capture I find idiosyncrasies that I have not been aware of in footage from other recording media (such as video). Motion capturing myself has allowed me to observe aspects of my gesture and motion that had otherwise been invisible to me (but perhaps not to others). I have a limp; I look at my feet when walking; I position the chair with my hands before I sit down; I make

sure the chair is still there (and hasn't wheeled away) as I sit down. I have a self conscious way of moving through space. I rely on visual cues to navigate around objects. Whilst this all makes sense to me (I have proprioceptive deficit in the lower half of my body), seeing my own motion, face to face, with no other information about place, time and context has given me an insight into the way I am, that I have never been able to see before.

The moments when the performer stops performing, forgets about the cameras or drops their guard are, for me, the most compelling pieces of motion capture. More interesting still, is motion captured footage of non-performers, individuals who are not perhaps relaxed in front of the camera.

I am intrigued by the notion that Motion Capture is, like many other areas of animation production an 'asset', a component part of a very large and complex pipeline of a Film or Games production. Sequences of motion, mostly performed by unidentified performers will be kept in Motion Capture data bases to be reused in Games and their sequels. Efficiency is paramount within the pipeline and assets such as models, environments, and animation are designed to plug into this pipeline to keep production flowing. Furthermore, Mocap was once thought of as a labour saving method of producing animation sequences in bulk, quickly and relatively cheaply. However. it is no longer, viewed as the 'cheating' form of animation but rather as a method and a medium in its own right. Through studying Motion Capture as portraiture it is the identity of the sitter that is paramount to the project. The captured motion rather than being an asset becomes the fundamental building block.

HAUL OUT – GOODBYES

Tegan Smith

The YouTube video project *Haul Out* is a riff on shopping exposés where young people show off recent purchases. By creating a persona who cannot let go of possessions and using stuff I plan to discard, I reveal the underside of consumer joy. I present strategies for using social networking sites, specifically regarding how YouTube operates, public visibility, and the nature of physical and electronic garbage.

Fig 1. Haul Out: 3 Second Thoughts, 2010 and Haul Out: Swap Meet, 2011, Tegan L. Smith, video stills.

Fig 2. Haul Out: 8 Unboxing and Demo, 2011 and Haul Out: 9 Elvis Balloon, 2011, Tegan L. Smith, video stills.

Fig 3. Haul Out: 3 Second Thoughts, 2010, Tegan L. Smith, video still.

Through my video project Haul Out – Goodbyes, I reflect on consumer excesses in light of accountability to things cherished and discarded; and consider how YouTube participation is influenced by the specific ways it operates as a technology, video-sharing community and commercial enterprise. In this paper I focus on three areas of uncertainty: multiple purposes, public visibility and waste.

Multiple Purposes

After completing ten *Haul Out* videos, I mull over whether artistic and critical interventions in social media networks have the ability to withstand the flow of commercial messages. This series is a riff on the proliferation of YouTube shopping exposés such as *Hauls,* where people show recent purchases, and have created a fashion and bargain forum. Young women with the most viewers are beginning to make careers with sponsored *Hauls*. From the opposing side of consumer joy, my videos emphasize bad shopping habits, amassing useless things and general wastefulness. The objects I showcase are not new, rather they are about to be given away as charity shop donations. Unlike in the *Hauls*, my price tags are long gone and would not be evidence of thrift but examples of money frittered away. The *Haul Out* vlog was launched on November 26th, Black Friday, or conversely, Buy Nothing Day. Advocating for not shopping becomes problematic in a medium such as YouTube, which is based on advertising.

The *Haul Out* series is part of a larger project, *Tender Loving Stuff,* in which I tackle hoarding and wasting as they relate to psychological attachment, economic prosperity, poetic inspiration and transgression in contemporary social practices. Assuming the YouTube persona TLS1HO began as a spontaneous attempt to understand compulsive buying and stockpiling. The character allows me to indulge in the incomprehensible anxieties of someone who cannot let go of possessions. I toy with truth and fiction in the act of

reclaiming my real-life belongings as art props, and naming the project and persona after my initials. No-tions of self and morality are uncovered through statistics of visibility: this is my reality show and I am performing a version of my life.

The transformation of my art practice from video installation to purely internet pieces was a deliberate strategy based on questions about materiality. My primary goal was to explore ideas about stuff without creating more. During the last decade writers and academics from various disciplines have re-examined the degradation of the global environment, while rethinking the relationship between people and stuff in terms of past materialist theory. Notably, W.J.T. Mitchell is "encouraged…by the precedents of Marx and Freud, who both felt that a modern science of the social and the psychological had to deal with the issue of fetishism and animism, the subjectivity of objects, the personhood of things." [1] As I rummage around my hunches about the agency of stuff, I ruminate on thing-power. There is something more complex involved than individual human desires or capitalist manipulations of them. The *Haul Out* videos offer a perspective for observing the plethora of published work, internet sites and television programming on material chattels.

YouTube genres known as *Haul, Demo and Unboxing* provided existing phenomena to engage with ideas regarding objects, identity and commerce. The three internet categories epitomize YouTube's role as a site for grassroots video production and networking, conjoining with its marketing intent. The videos are shot mainly in private spaces, often in a bedroom. Each video proceeds as a seemingly unscripted one-sided conversation directed at the viewer. The vloggers talk informally, while describing in glowing terms one acquisition at a time. The *Haul* videos are made chiefly by women in their teens and twenties with newly-bought clothes. In *Demo* videos they demonstrate how to use products, usually makeup. A few young men present clothes and makeup in a similar gushing manner to their female counterparts. The *Unboxing* videos are primarily the domain of male geeks who unpack the latest electronic gadgets. In their version of the *Demo,* they set up new equipment. Like many YouTube aficionados, I am drawn to watching these optimistic young people. Elle and Blair Fowler (pseudonyms), twenty-three and eighteen year old sisters, are famous examples. They are interviewed on national television, have hired Holly-wood agents, and are now paid for showing specific brands. Truth in advertising legislation has come into play, and some young vloggers use their YouTube channels for pitching their skills to potential spon-sors, raising the spectre of self-promotion in social networking.

YouTube is a challenging venue for an art piece, and for an older participant. The numerous videos posted with free, web 2 public access make it an easy place to show off, and an easier place to get lost. Convincing people to view a video takes more than simply posting. According to Jean Burgess and Joshua Green, YouTube literacy "means not only being able to create and consume video content, but also being able to comprehend the way YouTube works as a set of technologies and as a social net-work," and the most capable users are in their twenties or thirties. [2] Viewer statistics record an imme-diate standing for each video, and YouTube's ranking algorithm includes views, ratings, shares and links. The vlogger's choice of taglines determines what categories will be matched with their videos. A recent search of "haul out" shows that my videos have slipped behind several sailboat haul outs. Although I have used the tag "haul" on all the *Haul Out* videos, none appear in that word search. Elle and Blair in-variably top the list. A producer has no control over what individual and corporate advertising pops up as suggested watching beside their videos.

Public Visibility

While Elle and Blair's videos clocked over seventy million viewers in three years, my *Haul Out* videos had just over five hundred during their first six months. In comparing the TLS1HO moniker to their glamorous AllThatGlitters21 and juicystar07, mine is homely. In stark disparity against their youth, meticulous make-up and accessories, TLS1HO is mature, unmade-up and shabbily dressed. Cute items enthusiastically displayed contrast with the worn and unsuitable things shown by my older, rumpled and not so self-assured persona. Their articulate and confident performances prompted me to edit out ums making my later videos half their original lengths. Among the haulers, there are socio-economic status clues in items shown, presentation polish and production quality. The most-watched videos are much more slickly produced than mine. Burgess and Green say that "...to build an online presence within the YouTube community as a vlogger requires time, patience, and persistence, rather than a more casual mode of engagement with YouTube." [3] Elle and Blair blog, tweet and facebook constantly, and their admirers post fan pages. Flirting with cyber-celebrity, I keep track of my *Haul Out* statistics to post on Facebook, Twitter and my website. Such public exposure might reveal vulnerability and could result in setting oneself up for embarrassment, like imitating the popular girls in high school. Elaine Scarry says that "...if the person or thing outlives its own beauty... then it is sometimes not just turned away from but turned upon, as though it has enacted betrayal." [4] Emulating young beauty, and the latest trends could be seen as treachery, or instead unveil too much about consumer products, the human body and inevitable decline to develop a massive following. On the other hand, my videos might find aesthetic relevance as cautionary tales about the worth and treatment of stuff.

The *Haul Out* series is both personally and socially timely. *Tender Loving Stuff* grew in response to helping family members move. I became riveted to reality television shows such as *Life Laundry* about compulsive attachments to possessions, and frequented internet support groups for hoarders' families. In one episode of the television show *Hoarders*, a woman broke down in tears when she realized her childhood teddy bear was under her heap of junk, and that she should have taken better care of it. Her grown children were disgusted, for they felt more neglected than any teddy could. Compulsive shopping and squirreling away behaviors are often associated with fearful memories from periods of economic hardship. As an artist and former economist, I aimed to investigate beyond individualistic psychological explanations for other insights into the prevalence of hoarding. Anthropologist Daniel Miller says his studies show that "...the people who successfully forge meaningful relationships to things are often the same as those who forge meaningful relationships with people..." [5] The TLS1HO starting point was the curiosity and confusion of not understanding other people's attachments. Playing and playacting provided a vehicle to inhabit another point of view. Even while TLS1HO voices opinions and displays emotions that are not exactly my own, ad lib faltering seems to make it more authentic than it is. My detachment quickly melts away as I discover the contradictions of my self-deception, and begin to recognize my profligate and avaricious paths.

In the search for more resources and an on-line community, I revisited videos of critical theorist Slavoj Zizek, who takes on global issues as a loud, confident and imposing presence, whether at public lecterns or a landfill. By contrast TLS1HO's small, hesitant persona speaks in a conversational tone from the kitchen or bedroom. While Zizek pounds the air for emphasis, TLS1HO fondles objects with both hands. She looks into the self-operated camera as cohort in production while Zizek seems unaware of the lens. His diatribes incorporate political imperatives and abstract philosophies, whereas TLS1HO's ramblings on domestic concerns occasionally build to whiny harangues. I compare my work to such a tour de force because we are of the same generation with similar interests, yet work in different styles. TLS1HO seems stereotypically feminine in her concentration on shopping and domestic space. Her informative

videos extend to coherent storytelling within the milieu of YouTube shopping vlogs, and acquire social relevance only when enlarged to mass consumption and aggregate demand. Fortunately, there is a sense that anyone can do what she is doing: TLS1HO is no star, and that may prove to be her strength. If she can avoid narrowing her appeal to a niche group and encourage people to examine their own possessions, she might thrive in what Burgess and Green find scarce in YouTube: space for "quieter forms of engagement." [6]

<div style="background-color:#4FC3DE; color:white; padding:4px;">Waste</div>

The *Haul Out* project confounds social media and consumption behavior, and draws attention to the ways we coax, idealize, thank and admonish inanimate objects for their performance; use stuff to express individuality, even when it is mass-produced; and collect as a means to prevent feeling empty, lonely, or forgetful. As interactive electronics are becoming integral to daily life it hardly seems unusual that TLS1HO talks to things. As stuff is accumulated and consumed, it is invariably mistreated, favored over and becomes a minute detail in a heap of more stuff. Through the Haul Out videos I comment on responsibility for garbage, while resisting or not, the temptation to buy more. As TLS1HO views her image, she becomes concerned about buying new clothes, makeup and technical equipment.

My personal mound of obsolete and broken electronics is daunting. So far I have dealt with only one appliance, an electric wine vacuum. I have boxes of discarded computer equipment waiting for a *Haul Out* treatment. Such waste contains lead, mercury, arsenic and chromium that can effect human and animal health. According to Environment Canada, 140,000 tons of e-waste are dumped annually and the amount continues to increase. [7] In the U.S.A alone there are over 200 million active mobile phones. To prevent dumping in developing countries, disposing of electronic equipment is now the subject of international law. [8]

Comparing material objects versus digital data and dissonant feelings about dropping each in the trash, I butt against cyber overindulgence. I began adding up my space occupied on YouTube, Vimeo, Facebook and Twitter accounts, my personal website and current entries on other websites, and gave up when a check on wayback.archive revealed references to past exhibitions, one appropriately from the former DeadTech gallery. Like garbage in a landfill, electronic junk piles that I think are gone are still there: will my electronic trash end up with twitter tweets in the Library of Congress or in someone else's mash-ups? At the risk of feeling overwhelmed by Well-Informed Futility Syndrome, I face additional concerns about the electricity which runs technologies. The examination of unwanted manufactured products takes on a broader meaning with recent natural disasters, as I imagine my stuff floating on a tsunami. The devastating effects of earthquakes, floods and wildfires are exacerbated by products of human invention, like the nuclear power plant. New media speeds up information transfer and nanotechnology promises to reduce storage size, at the same time, rendering devices instantaneously obsolete; and it sometimes seems that what we are saying is going out of style as quickly as the medium.

The *Haul Out* videos reveal a jumble of art concerns, social critique and self-indulgence that parallel the odd and ordinary junk in the donation bags. In *Vibrant Matter* Jane Bennett says that objects "…have the power to startle and provoke a gestalt shift in perception: what was trash becomes things, what was an instrument becomes a participant, what was foodstuff becomes agent, what was adamantine becomes intensity." [9]Hopes are raised for the reinvigoration of democratic principles through social networking and contemporary materialism which takes into account the molecular structures of things and organisms as colonies of microbes. Boundaries between the animate and inanimate change. By giving each

item a moment in the spotlight, I pay homage to its function as a memento to guard against forgetting, and to abet in conjuring up a fictional history of success, accomplishment and love. Excessive memorabilia collections can interfere with sorting through what is important to remember, and clog the present moment, preventing immersion in current relationships.

I conceived and framed the *Haul Out – Goodbyes* project as art even though it was produced independently without plans for showing it within the art market or traditional institutions. As TLS1HO struggles to detach from possessions, I become more considerate of individual objects, their connectedness and the quiddity of stuff. Despite the challenges, YouTube offers a context to reflect on humble objects disregarded after the initial stimulation of purchasing wanes.

References and Notes:

1. *W. J. T. Mitchell, What Do Pictures Want? The Lives and Loves of Images(Chicago, IL: University of Chicago Press, 2005), 30.*
2. *Jean Burgess and Joshua Green, YouTube: Online Video and Participatory Culture (Cambridge: Polity Press, 2009), 72.*
3. *Ibid., 74.*
4. *Elaine Scarry, On Beauty and Being Just (Princeton, NJ: Princeton University Press, 1999), 50-51.*
5. *Daniel Miller, The Comfort of Things (Cambridge: Polity Press, 2008), 195.*
6. *Jean Burgess and Joshua Green, YouTube: Online Video and Participatory Culture (Cambridge: Polity Press, 2009), 74.*
7. *Statistics Canada official Web Site, "Goodbye E-Waste," June 28, 2006, http://www41.statcan. ca/2006/1762/ceb1762_003-eng.htm (accessed May 16, 2011).*
8. *Andrew Zangilli, "Responsible e-Waste Disposal," FindLaw Web Site, September 20, 2006, http:// articles.technology.findlaw.com/2006/Sep/20/10271.html(accessed May 16, 2011).*
9. *Jane Bennett, Vibrant Matter (Durham-London: Duke University Press, 2010), 107.*

CREATING BLACK BOXES: EMERGENCE IN INTERACTIVE ART

Joan Soler-Adillon

In the context of interactive art, emergence can be understood through a close analogy to an unpredictable black box. Cariani's emergence–relative–to–a–model and his notions of combinatoric and creative emergence can be used as a guideline to analyze the presence of emergent phenomena in interactive art in general. A thorough understanding of these phenomena should allow for the creation of pieces that exhibit emergent interactive behavior.

Introduction

A black box is typically understood as any device, system or part of them that remains opaque to whoever tries to understand how it works. One can only know what comes in and what comes out of it, but not what happens on the inside. The idea was first developed in engineering, but it later on was generalized, mainly under the influence of systems theory discourse in early cybernetics.

In the first paragraphs of the usually considered founding text of the discipline, Arturo Rosenblueth, Norbert Wiener and Julian Bigelow defined their object of study, a behavioral approach to knowledge, in the terms of a black box–like entity: "Given any object, relatively abstracted from its surroundings for study, the behavioristic approach consists in the examination of the output of the object and of the relations of this output to the input (…) omitting the specific structure and the instrinsic organization of the object." [1]

This was further elaborated by W. Ross Ashby, who generalized the idea to examples such as a child trying to open a door, while not being able to examine the connection between the handle and the latch which remains hidden inside the opening mechanism. The point is that, in fact, we are interacting with black boxes all the time: "In our daily lives we are confronted at every turn with systems whose internal mechanisms are not fully open to inspection, and which must be treated by the methods appropriate to the Black Box." [2]

These methods consist, in a nutshell, first in the definition of both the inputs and outputs of the system under examination, and then in the experimentation with those in order to establish the relations among them (the protocol in Ashby's terms). The goal is to find the regularities and repetitiveness in behavior that will inform the experimenter of the inner workings of the box.

Unpredictable Black Boxes

Both in its original engineering context and in general, black boxes need to be fundamentally reducible and predictable. Its interior will remain unexplored, but theoretically it can be understood in terms of the analysis of its parts and how they are connected, and the relationship between inputs and outputs has to remain the same over time. Otherwise the task of the experimenter testing it would be an impossible one.

But there is another kind of black boxes which is of interest here. These would be much less predictable black boxes. That is, systems in which the relation of inputs and outputs is not fully foreseeable, and the inside of which is not only unknown but unknowable, not reducible to the analysis of its parts and connections upon an eventual opening of the box (or zoom in into the system).

These black boxes are found at the heart of the cybernetic theory, in the form of adaptive devices. Most certainly not all black boxes and adaptive devices in cybernetic discourse are of this kind. In example above, the child doesn't know the insides of the door but these are knowable once the door's handle–latch system is inspected. The black boxes that Ashby found everywhere can be of both types. But what is important here is that both can be viewed as a central idea in the ontology of cybernetics.

According to Andrew Pickering, this ontology allows cybernetics to propose an image of the world that is performative rather than representational. A theory of knowledge which is largely built up through a performative relationship with black boxes, and many of them are of the unpredictable kind. Rather than about control in a classical sense, "the entire task of cybernetics was to figure out how to get along in a world that was not enframable, that could not be subjugated to human designs – how to build machines and construct systems that could adapt performatively to whatever happened to come their way." [3]

This performative knowledge is the above mentioned behaviorist approach of early cybernetics, or what Ashby himself call an "ultimate practical purpose" [4] of his black box methodology.

The Designer's Point of View

Another characteristic of the cybernetic approach to the black box is that it is not only about dealing with these systems, but also about creating them. Indeed, this is something that some cyberneticians did, like e. g. W. Grey Walter's Tortoises, W. Ross Ashby's Homeostat or Gordon Pask's Musicolour Machine. [5]

The idea here is to create something that will appear as a black box to its own creator. That is, a device that will surprise its designer, in terms of its behavior and of the relationships between the inputs it receives and the outputs. That is, even though she has designed and programmed it, the relationship between what the system or the piece perceives (the inputs) and how it responds to it (the outputs) become unexpected.

This is precisely where the ideas of the unpredictable black box and emergence can be linked. As will be explained below, emergence implies fundamental novelty, i.e. that the system creates something that was not explicitly built on it by its designer.

This is not something that a designer of a conventional computational system would desire, but it can be the case in digital art practices. In generative art and especially in Artificial Live (ALife) Art, it is often sought by the artist to create systems or processes which exceed her expectations. The idea is to do so not through some blind trial and error, but through emergent phenomena (or self–organization in cybernetics discourse): "The basic principle of emergence is that organization (behavior/order/meaning) can arise from the agglomeration of small component units which do not individually exhibit those characteristics". [6]

What is Emergence?

Emergence, in its many forms and contexts, is always related to fundamental novelty. It is often explained with the idea of a whole being 'more' than just the sum of its parts. That is, of being irreducible to the analysis of its conforming elements in isolation.

These explanations are usually articulated in terms of different levels of complexity, in which the lower or micro levels (the parts) generate processes which appear at the upper or macro levels (the whole) as emergent, i.e. not explainable with a classic cause–effect relationship.

This idea questions the traditional reductionism of science, since it implies that not everything is explained by studying smaller and smaller parts of whatever system is under analysis. Whenever emergence is present, reductionism is brought into question. A classical generic example would be to question, in the succession of orders of knowledge physics–chemistry–biology–psychology, if each one is fully reducible to the previous or if, instead, emergence occurs when a level of complexity increases.

Emergence didn't become a concern in the academic discourse until the mid–ninetieth century, when John Stuart Mill used the concept (not the term, which was introduced later by George Henry Lewes) to distinguish different types of causation, but it still remained a marginal concept. In Newtonian science emergence was unknown and unknowable. In fact, it is by definition inconsistent with a science that aims to reduce all possible phenomena to simple facts and laws, in which reductionism is an indisputable method.

It was not until the second half of the twentieth century that the work of some rather unorthodox scientists started to prepare the context for it to appear in its contemporary form. By the end of the century, it was already a central concern in the Complexity Sciences (ALife, dynamical systems theory, neural networks, etc.). [7]

Typical examples used to describe emergence include ant or termite colonies and their social complexity, the human mind understood as a product of the interconnectivity of neurons in the brain, chemical clocks in non–equilibrium thermodynamics, or the complexity generated from the simple rules of cellular automata.

Emergent Interactive Behavior

In the context of digital art, emergence has been mostly been experimented with in ALife Art. ALife art is the artistic arm of the scientific Artificial Life, a discipline which comprises "a range of (mostly) computer based research practices which sought, among other things, alternatives to conventional Artificial Intelligence methods as a source of (quasi–) intelligent behavior in technological systems and artifacts. These practices included reactive and bottom–up robotics, computational systems which simulated evolutionary and genetic processes, and are range of other activities informed by biology and complexity theory." [8]

In this context, the idea of emergent interactive behavior is to create systems that respond and behave not in a predetermined way, reading responses from a database – or responding as if they did – but generating these responses through emergence: "Emergent interactive behavior would not be derived from

a set or pre–determined alternatives. Rather, behaviors might arise through a contingent and uncon-
nected chain of triggers." [9]

This mid–nineties ideal has been rarely, if ever, completely achieved in interactive artworks. In fact, it
depends on how we choose to understand emergence that determines whether or not it has been (see
below).

Two of the most often mentioned examples of emergence in Artificial Life are Craig Reynold's Boids and
John Conway's Game of Life. In both, a very simple set of rules produces astonishingly complex results
when the systems are simulated. In Art, examples are scarce. Simon Penny's 1995 Sympathetic Sen-
tience is one of the most cited ones.

Works in which Genetic Algorithms are involved are usually related, too, to emergence. Examples of
these would be Christa Sommerer Laurent Mignonneau's A–Volve, Ken Rinaldo's Autopoiesis or Ruairi
Glynn's Performative Ecologies, to name a few.

Creative Emergence

Just like Ashby was concerned with defining a black box, and claimed for a clear delimitation of what the
inputs and outputs to be analyzed were, if we are to understand how emergence does really occur in
interactive art, we need a method that delimitates what to observe and judge, in order to be used as a
tool for analysis first, and creation later.

The method to be examined here finds its context in the literature of Artificial Life and, more generally,
in cybernetics. It is Peter Cariani's analysis of 'percept–action systems' (autonomous artificial systems
and devices which perceive and act on their environment) and how they might exhibit emergent proper-
ties that would lead to changes (improvements) on their performance. [10]

Cariani's approach is known as emergence–relative–to–a–model. Unlike other approaches to Emer-
gence, Cariani does not accept the switching among levels of complexity (e. g. from the molecule to the
pattern) in order to describe emergent phenomena: "For the purposes of judging whether an emergent
event has occurred, we need to be careful not to shift frames of reference in these situations, from talk-
ing in terms of microstates and pixel states before and "higher level" features afterwards. If we start to
observe the device in terms of individual pixels, we must continue to do so in those terms throughout. If
we wish to include complex pixel patterns (e.g., cycles, waves, moving patterns which look to us like a
horse galloping), they need to be in our state descriptions from the start, or they will remain in the
realm of tacit, private observation, unrecognized by our public model." [11]

He labels his approach as an "epistemological, observer–relative conception of emergence." [12] An ap-
proach which is similar to that of Ashby's concerning the black box problem, and which fits perfectly
with the aim to find a use of emergences for the designer of an artistic interactive system. The concern,
like in the early cybernetics and also in interactive art, is on how the interactants relate to the system
performatively.

In order to discern whether or not emergence occurs in a system, Cariani proposes the construction of a
model of it, very much like Ashby's experimenter constructs a protocol from the examination of the rela-
tions among the inputs and outputs in the box.

This model is built after observation of the system, simulating it if necessary. It must contain all possibly observable system states and transitions, according to a predefined set of observable variables that explain its behavior. Once this is done, more observation is performed. It is in this observation relative to an observational frame that emergence either occurs or it doesn't.

Once more, this is contrary to many descriptions of emergence, which use precisely the moment of simulation of the system to account for emergence. In these descriptions, emergence occurs when the result of the simulation differs from the expectations that one would have after examining the individual elements and the rules to be simulated, as does happen in Reynold's Boids or Conway's Game of Life when one sees them for the first time.

Cariani's model is based on a semiotic framework of syntactic, semantic and pragmatic operations, which correspond respectively to the computations, measurements and evaluations. [13]

The syntactic operations exist in the symbolic realm. They are logically necessary and governed by conventions (rules). In these operations, the system relates symbols among them generating the state transitions and, therefore, changing the system's state through computations.

Semantic operations involve measurements and actions. That is, relations of the system or device with its environment. They are empirically contingent and materially governed. The possible measurements for the device (through its sensors) determine its epistemic capabilities. The variables in the world that the system can perceive and how it measures them are determined by the configuration of the sensors. This is where the symbolic part of the system is in contact with its non–symbolic environment.

Finally, there are the pragmatic operations, which evaluate the sensor readings of the semantic level and computations in the syntactic level vis–à–vis the system's goals.

When emergence does happen, it can be either combinatoric or creative. Combinatory emergence consists in changes on the syntactic or computational operations. In this case, the set of primitives (building blocks) with which the device works doesn't change, but the combinations of these primitives do, allowing for novelty to arise. Devices that fall into this category are computationally autonomous.

These systems are closed in the sense that their search space, no matter how big, is always finite. If the primitives are defined beforehand, the possible combinations among them are also predefined.

Creative emergence is a much more fundamental way for creating novelty. It consists in the introduction of new primitives in the computations, through changes in the semantic operations of the system (semantic adaptation). This happens when a new sensor is added (through evolution) in the system. It could also be the case of an increase of the sign–states in the system (the equivalent of creating new concepts in a human mind).Devices that fall into this category are epistemically autonomous.

As opposite to the closeness of combinatoric emergent systems, these are open–ended systems and devices, as their search space is ill–defined. If new primitives can be added through the introduction of new sensor capabilities, the creation of new behaviors (transitions between system states) is theoretically unlimited.

Emergence and Interactive Art

According to Cariani's methodology, we can understand how combinatoric emergence might occur in ALife simulations. The key issue is to generate a large number of interactions among the system's fundamental elements (Cariani's primitives), which in certain cases will generate emergent phenomena observable through simulation. This would be, for instance, the case of genetic algorithms.

My own installation Digital Babylon from 2005, which used genetic algorithms, can serve here as an example. This piece represented a simple ecosystem with two species and a food element. Once all the rules were set and the simulation run, patterns of behavior appeared in some of the species and the system as a whole. Some of these would be emergent under some descriptions of the phenomena, but not under Cariani's model.

What would fit his combinatoric emergence, though, were the changes in behavior that appeared after a rather long simulation of one of the prototypes of the piece. In it, one of the species had significantly changed its behavior due to the recombination of the characteristics in its individuals. E.g. they moved in small circles and very close to each other, which significantly differed from their initial behavior. [14]

Much more difficult is to account for creative emergence. The most evident way to do so would be for the device under analysis to evolve new sensors and expand its epistemic capabilities (its abilities to perceive its environment). But this, which has happened in natural systems, is extremely rare in artificial ones.

Another way would be to create autonomous objects capable of evolving new primitives through interaction of the cybernetic devices with humans. If the biological examples are the most clearly emergent, mixed artificial–biological systems should have its possibilities.

Humans beings, from a systemic point of view, can facilitate the creation of novel ideas (adding new primitives to expand their sign state–sets), allowing for creative emergence to occur. And this can be a way to open the closeness of the computer's formal system: "Human–machine combinations can be open–ended systems that generate new primitives." [15]

Thus, a door is opened here to the creation of fundamental novelty in the context of interactive art. With Cariani's methodology, a system can be described in detail and designed so that it allows for the system–interactant relationship to create new primitives and, therefore, newness in the first or in both, by amplifying the possible sign–states.

Conclusions

If carefully defined and used, emergence can be a powerful concept in the creation of interactive art systems. From the artist's point of view, it can be understood through the idea of the unpredictable black box. When creating an explicitly intended emergent system, the artist will know what the inputs to it will be, but hopefully the outputs will deviate from her expectations precisely because it is designed in such a way that its inner workings cannot be fully specified.

There is a clear paradoxical component in designing a device that should be emergent, since emergence is precisely the opposite of specification. But following a methodology like Cariani's, and allowing inter-activity into the system, we should be able to generate devices and systems which exhibit emergent interactive behavior.

References and Notes:

1. Arturo Rosenblueth, Norbert Wiener, and Julian Bigelow, "Behavior, Purpose and Teleology," in Philosophy of Science 10, no. 1 (1943): 18-24.
2. W. Ross Ashby, An Introduction to Cybernetics (New York: Wiley, 1956), 86.
3. Andrew Pickering, The Cybernetic Brain (Chicago, IL: University of Chicago Press, 2010), 30-31.
4. W. Ross Ashby, An Introduction to Cybernetics (New York: Wiley, 1956), 106.
5. Andrew Pickering, The Cybernetic Brain(Chicago, IL: University of Chicago Press, 2010), 30-31.
6. Simon Penny, "The Darwin Machine: Artificial Life and Interactive Art," in New Formations, no. 29 (1996): 59–68.
7. Limited space precludes me from delving more deeply into matter.
8. Simon Penny, "Twenty Years of Artificial Life Art," in Digital Creativity 21, no. 3 (2010): 197-204.
9. Simon Penny, "The Darwin Machine: Artificial Life and Interactive Art," in New Formations, no. 29 (1996): 59-68.
10. Peter Cariani, "The Semiotics of Percept–Action Systems," in International Journal of Signs and Semiotic Systems 1, no.1 (2011): 1-17.
11. Peter Cariani, "Emergence and Artificial Life" in Artificial Life II, eds. C. Langton, C. Taylor, J.D. Farmer and S. Rasmussen, 775-789 (Redwood City, CA: Adison-Wesley, 1992).
12. Peter Cariani, "The Semiotics of Percept–Action Systems," in International Journal of Signs and Semiotic Systems 1, no.1 (2011): 1-17.
13. Peter Cariani, "Emergence and Artificial Life" in Artificial Life II, eds. C. Langton, C. Taylor, J.D. Farmer and S. Rasmussen, 775-789 (Redwood City, CA: Adison-Wesley, 1992).
14. Joan Soler-Adillon, "Digital Babylon," Joan.cat, http://joan.cat/project.php?id=1 (accessed July 8, 2011).
15. Peter Cariani, "Strategies for Creating New Informational Primitives in Minds and Machines," Dagstuhl Research Online Publication Server, 2009, http://drops.dagstuhl.de/volltexte/2009/2192/pdf/09291.CarianiPeter.Paper.2192.pdf(accessed July 8, 2011).

SOFT CLOUDING – CURATING A NEW SEMANTICS FOR SOUND ARCHIVING

Morten Søndergaard, Thomas Markussen, Barnabas Wetton & Ivan Dehn

This paper will present and discuss the *Soft clouding* project from the perspective of the three practices and competencies brought together in one transdisciplinary process of curating a semantics of sound: Technological, Humanistic / Curatorial, and Design / Action-based.

Soft Clouding is a blended concept, which describes the aim of a collaborative and transdisciplinary project. The concept is a metaphor implying a blend of cognitive, embodied interaction and semantic web. Furthermore, it is a metaphor describing our attempt of curating a new semantics of sound archiving.

The *Soft Clouding* Project is part of LARM - a major infrastructure combining research in and access to sound and radio archives in Denmark. In 2012 the LARM infrastructure will consist of more than 1 million hours of radio, combined with metadata who describes the content. The idea is to analyse the concept of 'infrastructure' and 'interface' on a creative play with the fundamentals of LARM (and any sound archive situation combining many kinds and layers of data and sources).

This paper will present and discuss the *Soft clouding* project from the perspective of the three practices and competencies brought together in one transdisciplinary process of curating a semantics of sound: Technological, Humanistic / Curatorial, and Design / Action-based.

Everything is tagged…

One of the main obstacles of creating an interface for an infrastructure, which contains a combination of many already rather large archives, is the amount of information involved; the way it is structured and described – on all kinds of levels.

In this regard, it is very near – but not similar – to the concept of 'cloud computing'.(Leadbeater 2010)

Cloud computing is a concept for next generation Internet where data is organized in a different manner, than is the case in the current www setup. The speed and growth of the Internet means we are drifting away from taxonomy and the search-oriented architecture gives us new possibilities in crowd sourcing and collaboration. The innovative idea of Cloud computing is that everything on the future www is 'miscellaneous', yet traceable in tagged contexts (Weinberger 2008)

Emergent technologies like *Echonest* and others, gives us a opportunity to 'trace' sequence and identify 'hidden' content in large amount of sound data. On the other hand, some of the mechanisms of emergence are organizational and collaborative, rather than purely technical.

The next most likely stage of the web's technical development – cloud computing – will act as a giant accelerator for cultural cloud formation. 'It will be like a giant machine for making clouds of culture.' (Leadbeater 2010)

Everything is tagged…

Cloud Computing & Digital Infrastructure

However, the LARM infrastructure is not yet one cloud of data, but consists of many clouds of data coexisting and overlapping each other. This is partly due to the in/consistency and in/compatibility of the many kinds of material in the different archives. But it is also due to the simple fact that digitalization is not the answer to everything in archives – especially, when the material is as time-based, particle-spatial and fugitive as sound.

Finally, it also appears that the system and epistemology behind the 'non-tagged' world is still very active – and not always easy to pursuade to give up the privileges of controlling 'their' cloud of data and information. Thus, there is a kind of power struggle involved in the ability to tag information across all platforms between the 'traditional' modern institutions - like libraries, media companies, and universities. The challenges of cloud culture is not only that of creating possibilities of digital infrastructures in society, that could change that society all together; it is as much a question of convincing and transforming a 'modern' post-industrial system of cultural politics.

As cloud culture comes of age, we need to make scenarios of possible uses of the tagged world. This is our attempt:

Our links to one another, we believe, will be increasingly routed through a vast shared "cloud" of data and software. These clouds, supported by huge server farms all over the world, will allow us to access data from many devices, not just computers; to use programs only when we need them and to share expensive resources such as servers more efficiently. (Leadbeater 2010)

An interface to an infrastructure of sound-archives is dependent on the development of alternative methods and modalities for 'seeing' and 'touching' acoustic temporality and its (natural and cultural) contexts. In other words, we need to 'curate' a new semantics of sound and sound archiving. In this context, to 'curate' receives an extra level: to create and manage a systems design.

Soft Clouds…

Thus, we conceive soft clouds as the clouds of data, metadata and relations between data and things in the cloud (sound and radio programs i.e.) that you generate in a (research or creative) process.

The cloud is a promising cultural tool. In order for tags in the cloud to become culture, we would argue that we need another level of interface where the human body (the 'soft' level of HCI) is active.

We want to create an interface for that process where you may create and operate with your own 'soft clouds' – either from existing data and material on the platform, or from new material and data (or both).

Soft Clouding is taking networking to a new level (of reality) outside the taxonomies of the Internet.

It is embodiment without the (physical) body.(Ihde 2002)

The infrastructure is NOT the Internet, it is not ONE cloud of data either - it is something different. The infrastructure's primary inventive point is the link between body position and information. We are building a system that flows and links between different ways of organising information in a way that parallels the way the mind works and organises in parallel organisational fields (Pinker 1997). It is a bodily sensing of information in loose conversational clusters that can be manipulated in space.

Innovation through metaphors…

Working in a transdisciplinary team we have asked ourselves the question: In what way can we make tangible representations of the ordering of sound and the information that pertains to it? This is as essential for a single user tool as it is for formulating a frame for the kinds of discussions that take place in a temporal context with more than one user involved.

In the transdisciplinary, innovative discussions we are using metaphors and images that can drive our thinking such as

- "it changes patterns according to what you are thinking about by reorganising the emphasis (metadata) that is connected to the groups of information."
- "It is a tangible time machine"
- "It is a map and a conversation at the same time"
- "It is transparent and yet consistent"

We want to be freed from the constraints of the Desktop paradigm. The Desktop paradigm is such a well-founded method of understanding the ordering of data - once ideas are digitalized, that they fall 'naturally' into our way of thinking. We want to move beyond that and take tagging to another level.

Grounding a collaborative systems design paradigm

Soft clouding is a way to work with embodied, physical space as a framing for reality-based interaction where the relations and i.e. in/consistencies of different material define the interface.

One of the dominating visions in interaction design driving this field – Reality-based Interfaces – is to design for increasing naturalness in the way we interact with computers through drawing upon our skills in the way we manipulate and understand the physical world.

In contrast to this view, our vision is that future use of computers should not just mirror our relation with the physical world, but should rather evoke new kinds of experiences that augment people's perspectives on the world. By basing our vision on this assumption our vision comes closer to the design paradigm known as *aesthetics of interaction* without being equal.

Aesthetics of interaction is an emerging paradigm in interaction design and Human-Computer Interaction that can be divided roughly into three approaches. The *media-centric* approach conceives of digital

aesthetics as the discipline that should make software engineers and designers conscious of how the computer functions as an expressive medium.

The *product-oriented* approach views aesthetic qualities in a more decorative sense as those pertaining to pleasurable or desirable qualities.

The *experience-based* approach to aesthetics sees aesthetic qualities as a resource for creating experiences with technology that not only affect our body, but also - through this affection - spark our imagination or evoke thoughtful interaction and critical reflection ([Krogh, Petersen et al. 2009](#))

We share the assumption with proponents of the experience-based approach that digital technology is a new sensuous material for designers that needs to be explored in its own right rather than being modelled on the idea of a refashioning or re-mediation of old media. Computational artefacts merge physical and digital materiality into new hybrid sensuous qualities and functionalities, which can be exploited in the design of educational settings, cultural institutions, urban space, and so on.

The sound archive is a Hertzian space or electronic geography made up by wavelengths of various kinds. With Soft Clouding we aim at developing a whole new conception of what an archive is and how people may access intangible and fugitive sounds through tangible and haptic experiences. Not in the sense of Tangible Interaction (Ishii & Ulmer) where interaction is reduced to physical controllers for two-hands manipulating digital information, for instance turning and twisting a bottle for playing music files. Rather than physical interaction our aim is to make a sound archive emerge in 3D architectural space. In this sense, it might seem as if we wish to revive Mark Weiser's idea of ubiquitous computing, according to which computer technologies should be integrated into the walls and floors of buildings transforming them into interactive spaces. Yet, in contrast to UbiComp, we do not subscribe to the idea of the invisible computer staying in the background and serving people like a butler whenever there is a need for it. The Soft Clouding project is based on a vision of making the invisible computer a sensible part of people's spatial experience, replacing the computer butler with a computer wizard inviting people to enter a new space for having sound experiences. In this space sounds are able to become tangible felt and sensed through the felt sensations and movements of the body. Now, how is this to be understood?

In the context of ordinary conversation the gestural and bodily underpins verbal communication as an extension/continuation of spoken language. Spatial positioning frames spoken language.

The need to position, make spatial and codify the spoken word through the body is so intense and ingrown that it is even used in telephone conversations where the listener is unable to see the point being made *through* the gestures of the speaker. Nonetheless, through the force of this gestural instinct the speaker is obliged to use it in order to make or emphasize a point. And the more emotionally intense the point being made the stronger is the impulse to move in order to able to express it.

From the perspective of the Soft Clouding team herein lies the key to how haptic, internalized sensed sensations can meet the external world in a paradigm that is, to a high degree, distinct from the desktop method of organizing information. We fully accept that "desktop thinking" is a powerful and well established default position for storing and organizing discreet units of information but it its form, based as it is on a visual representation of physical objects that cannot be easily reproduced or moved does not provide a sufficiently open potential for linking and thinking on your own or with others. We posit that Michael Polanyi's notions of tacit knowledge can provide us with a model for how *Soft Clouding* can be

experienced by focusing on the continuum between the sound space and the body; and the gestural as a way of accessing and organizing this material.

In the preliminary planning for the project, it was discussed how to create a bridge between the desktop paradigm and a vision of a playful open-ended space that is bounded solely by the size of the collection and the uses it is put to through the users. Therefore the primary research within the Soft Clouding project works experientially with how to position sound files in a three dimensional space through binaural sound input that can act with or as further, wider extension of the visual representation of the sound archive.

The average human has a visual field of around 80 degrees around the head facing forward. Of this peripheral vision – the part of vision that deals largely with movement and cannot perceive detail or colour to any great degree – makes up the greater part of the eye's function. Therefore our ability to see space is determined by a largely coordinated but unconscious movement of body and eye. In comparison we are able to hear 360 degrees around the head and place sound with a high degree of precision in relation to ourselves, including events that take place directly behind us. Understanding this fundamental difference makes it possible to establish an experimental space in Soft Clouding to test how the gestural relates to manipulating and playfully organizing ideas alone or with others in a technological body-space. We try to create an environment that is common and accessible to all the users, be they physically or digitally present in it.

The *Soft Clouding* project is working towards a parallel, otherworldly extension of the desktop paradigm in order to provide a new, gestural platform for organizational thinking and sharing. It thinks in terms of contexts and space rather than boxes and files. Although it takes sound archiving as its starting point the medium and long-term goal is to contribute to developing a new semantic about how to access and organize media in an experimental technological body-space that supplements the desktop paradigm.

Curating a new semantics…

To take this a step further, looking at some of the problems we face from a humanistic HCI-perspective, if Soft Clouding is to be successful the real impact of the new semantics would have to be operational on a cultural level (that is, expectations towards a technological body-space are collectively shared by a large number of people). Cloud computing does not 'just' translate into a systems design or a new paradigm for experiencing data overnight; it is based on a gradual transformation of an entire culture, into that which Leadbeater, perhaps a bit haphazardly, terms a 'cloud culture'.

This means, that for Soft Clouding to have any impact on an individual, personal level from any user we may imagine, this user would have to navigate intuitively with the semantics of a technological body. This, already from the start, makes it difficult to achieve a 3D space that would fulfil that semantics, if the cloud culture were not fully realized on a collective scale. Also, if we have to operate in sound, and with sound, as physical and acoustical elements in space, there would be at least 4 dimensions to navigate in – since time in sound experience and sound production is implicit.

Therefore, we are operating with the term technological body-space. To mark out the distinction from ordinary 3D experiments that we find are limited, especially in terms of the hugely expanded network metaphor of a tagged society; not to speak of the 'radical' idea to bring ALL of the human senses into an archive-interface and systems design.

It is a huge step away from (the idea of) the literary paradigm of archives, but only a small step ahead for a new semantics for sound archiving.

References and Notes:

Ihde, Don. Bodies in Technology, Electronic Mediations. Minnesota: University of Minnesota Press, 2002.

Iversen, O. S. , et.al. "On Emancipation, Quality & Democracy in Design." In Proceedings of NordiCHI 04, 171-80. Tampere, Finland: ACM Press, 2004.

Jacob, Robert J. K., et al. "Reality-Based Interaction - a Framework for Post-Wimp Interfaces." CHI08, no. Journal Article (2008).

Leadbeater, Charles. Cloud Culture : The Future of Global Cultural Relations. London: British Council, 2010.

Pinker, Steven. How the Mind Works. New York ; London: Norton, 1997.

Schifferstein, H., and Paul Hekkert. Product Experience. 1st ed. San Diego, CA: Elsevier, 2008.

Weinberger, David. Everything Is Miscellaneous the Power of the New Digital Disorder. 1. Holt paper-backs ed. New York, NY: Times books / Henry Holt, 2008.

LARM Infrastructre: http://www.larm-archive.org

CAMERA, CANVAS, AND COMPUTATION: NEW FRAMEWORKS FOR REPRESENTATION AND ABSTRACTION

Anne Morgan Spalter

Visual computing has irrevocably blurred the lines between representation and abstraction. Just as photography with its innovative realism changed the nature of painting, so digital image capture and computational creative processes are changing the relationships between previous traditional art media and directly influence our frameworks for creating and interpreting new media works.

Vacation Meditation, 16.5"x12.5" unique inkjet print, 2011. Collection of Genevieve Keeley.

Introduction
The relationship between abstraction and representation is a relationship of language to silence, of the recognizable to the wordless and experiential. Both art genres evoke an emotional response; both approaches have known histories and structures. They exist at opposite poles of the art magnet, however, and there is sparse middle ground. Either an image resolves perceptually into something recognizable or it does not. The brain seeks familiar cognitive objects - and may find something the artist did not intend - but a millisecond is enough to know whether a work is a picture "of something" or not.

The abstract can be seen as a categorical subset of representational work, as all the features of abstraction are contained within a representational work: composition, color, line, gesture, mark making, form, etc. Any representational work can be processed to relieve it of its burden of language and reveal the "abstract" features that contribute to the composition and mood.

The two genres are usually distinct from the beginning to the end of the creative process. It is rare that a traditional artist sets out to create an abstract work and ends up with a realistic picture - or vice versa. Some works can function on both levels giving each equal due, as maybe Pointillism does or some more extreme Cubism. Either genre can comment on virtually anything from the personal to the political - as artists from Motherwell to Malevich can attest.

The invention of photography had a profound effect on the goals of painting: the technical challenge of representation had been met. The documentary aspects and mathematics of perspective no longer had the same visual power in a painted work. Representation did not go away, as some had predicted, nor did the art of painting, but the focus shifted, bringing abstract qualities to the fore.

The invention of computers has brought about another change, just as significant, if not more so, and has brought things full circle. The computer does not treat pixels in an image of a face any differently from those in a red square. Although image processing algorithms can recognize faces and other objects these are still human constructs realized with code. The computer doesn't care or make these distinctions, all the data is the same - just as a realistic or abstract painting begins with the same tubes of colored paints.

In my artwork, the computer has afforded a new way of working with imagery and mark-making that transforms works from representational to abstract in a way impossible with traditional media. In recent works, I have been able to integrate digital photography, traditional drawing and painting, and 2D, 3D and motion-based computational effects to make works that combine the visceral impact of traditional physical techniques with the compositional complexity and perfect ordering made possible by computation.

The Working Process
For example, on a vacation in Jamaica, I took a digital of our hotel pool. Back in my studio in Pawtucket, RI, I used this as a reference for a pastel drawing. From the photo, I derived instant perspective and was able to recreate specific details of palm fronds and pool lighting. The pastel drawing is not a photograph replicated by hand but uses details that would be otherwise forgotten as a jumping off place for constructing a composition loaded with internal emotional and personal experience. These are conveyed through the use of gesture and color and, of course, the choice to include certain details and leave out others. I was fascinated by the artificial color of the pool water and its strict rectangular geometry in an otherwise natural setting and used this to construct an image that contrasts technology and nature.

The results, in part because of the digital photographic influence, employ a Western style of image-making, resulting in a representational work using standard perspective and other spatial cueing techniques such as color warmth, overlapping, and scale. The aspect ratio and field of view are also influenced by the digital course.

After completing the traditional drawing, I took a high-resolution digital photograph. Now the bits were in my computer, and became plastic again in ways not possible with the drawing hanging on the studio wall. In a single keystroke I switched polarities and entered the world of abstraction. My goal was to bring a type of Eastern, patterned, mathematical compositional strategy into play, without sacrificing the original mood of the piece. In other words, I wanted to use the computer to take the work someplace new, building on the original effort but using the computer to explore territories not possible with my wooden case of pastel sticks. (See Fig. 1.)

As a math major in college and a lover of Islamic art, I have always been fascinated by the power of patterns to describe space and transcend the everyday world, suggesting a higher order. The circular kaleidoscopic algorithm I used let me bring all these factors into play without letting go of the visceral mark-making and human touch that comes from drawing by hand. I created a series of images, that varied the role of the pool and its artificial coloring and that of the greenery growing around it. I was also intrigued by the level of complexity so easy afforded by the computer and its affect on the feeling of the work. The resulting works bridged cultures and received attention in Middle Eastern publications such as Vision magazine, The International Herald Tribune, and on Dubai One TV, as well as in the US. [1][2][3][4]

After experimenting with the compositional options I moved further into the computational realm by creating time-based works based on the same strategies. The sense of space and potential for motion in my work is an important aspect for me and setting the kaleidoscope in motion I was able to bring back the feeling of experiencing a space—not a traditional Western one anymore, but an idealized sensorium. By controlling such aspects of the center point from which the algorithm worked to the number of branches, scale and rotation, and movement speed, I could explore this new computational space interactively and choose the images and sequences that best conveyed my goals for the work.

I am continuing this exploration in new work, combining abstract patterning with recognizable objects that come and go during the piece. For example, in kaleidoscopic works based on video shot of highway traffic from a small plane, I am playing with patterns formed by the abstract semiotics of the highway - white dashed lines, solid yellow ones, signage, etc. - combined with recognizable portions and patterns of vehicles that emerge, rush by, combine or splinter, and disappear.

Conclusion

From the original digital photo through traditional processes and back to the computer in both still and motion-based contexts, I was able to explore an aspect of the external landscape that intrigued me and bring my internal emotional response into the work in a variety of ways. The abrupt shift from representational to abstract made possible by the computer is, I believe, indicative of the ways in which the computer continues to change the process of art making and interpretation.

References and Notes:

1. Mazria-Katz, Marisa, "Creative Force," Vision: Fresh Perspectives from Dubai, Issue 03, July 2011: 59-61.

2. Advertising Supplement, "The Art of an Emirate," International Herald Tribune, Thursday, July 21, 2011.

3. Channel Dubai One, Studio One show, Episode 54. March, 2011.

4. Greg Cook, "Review: Leitzel and Billings at AS220; and 'Creative Collective'," Providence Phoenix June 17, 2011: 19

RESPONSIVE SPACES: MOTION, ACTIVITY AND INTERACTIVE ART

Ryan Spicer, Andreea Danielescu, Aisling Kelliher & David Tinapple

We present an overview of interactive art that reflects human activity in physical space. We discuss the varied approaches of these pieces and present our own work, Building with a Memory, which is situated in a workplace and builds on this prior work to provide an informative and aesthetically satisfying experience.

Fig 1. Four approaches to representing human activity in interactive art. Top Left: Urban Pixels by William Mitchel and Susanne Seitinger. Top Right: You Are Here by Snibbe Interactive. Bottom left: Motion Traces by Tmema (Golan Levin and Zachary Lieberman) with Ars Electronica Futurelab. Bottom Right: Artifacts of the Presence Era by Fernanda Viegas. All images © respective artists.

Fig 2. Building with a Memory uses wall-mounted LED lights and a video display (see inset detail) to present current and historical human physical activity in a multi-use workplace. Copyright Arizona State University 2011.

Introduction

Sensing and responding to dynamic human activity occupies a rich position in the history of interactive art. Artists such as Camille Utterback, Golan Levin and Petra Gemeinboeck explore human movement as a physical, distributed and social phenomenon. Their work and that of the broader community engaged in creating responsive experiential art is the focus of our research and the inspiration for our creative experimentation.

We present an overview of works that track and display human activity, particularly movement. We focus on the temporal and spatial lenses each work adopts in interrogating and responding to human movement. The purpose and provocation of these installations range from utilitarian to aesthetic. Works such as Ishii's *Pinwheels* provide information on social and technological interactions. In contrast, Rokeby's *San Marco Flow* and Gemeinboeck's *Impossible Geographies* render patterns of movement at vastly different scales and require varying levels of conscious participation. The works represent varying approaches in feedback mechanisms, analysis of captured data and scale of detected and represented activity.

Inspired by these works, we introduce *Building with a Memory*, an interactive installation that captures and represents human movement in a collaborative workplace. Unlike other workplace media systems which often focus on interpersonal communication, we design an aesthetically-informed system that provides both artistic and informative value. We explore co-located and distributed sensing and feed-back, and display activity over scales varying from a single room to the surrounding environment. Recording, analyzing and representing the ebb and flow of activities over time provides opportunities to develop insight into the community, for members and visitors alike. We use indirect lighting and video

to provide ambient feedback. While we capture activity over time, we mask identity of individuals to maintain privacy while providing practical information on the history of the community.

A Survey of Bodies and History in Interactive Art

Some artists use the opportunities provided by interactive media to catalyze interaction with others in under-utilized public spaces, or increase awareness of the history of space. Other artists produce installations that encourage in-depth interaction between individuals and installations. Others use these mediums to make the viewer aware of the patterns of everyday activity in public spaces. Still others use these technologies to augment the workplace, providing ambient information to everyday users of the space. Each of these approaches has implications for the type of sensing and feedback, level of abstraction, and kind of historical and current data presented.

Many pieces encourage interaction between viewers and the installation in public space. Camille Utterback's *Aurora Organ* and *Abundance* exemplify this style of interaction. *Aurora Organ* invites patrons to engage with each other and six LED-lit acrylic columns through touch panels embedded in a lobby space's railing. By touching the interfaces, patrons can contribute splashes of color to the corresponding column; special cases reward patrons for working together to trigger all sensors at once. *Abundance*, a public-art installation in a building's courtyard, uses a projection mapped onto a building for output, and computer vision for input. Activity is captured as brightly-colored silhouettes that leave behind traces, which fade over time to lines. Certain patterns of activity trigger special responses, encouraging people to play in the environment created by the installation.

Pieces that encourage interaction between people in the context of the media system serve a different purpose. Snibbe Interactive's *You Are Here* (Fig. 1, upper right) is situated in a museum exhibit rather than a public lobby or courtyard. Like *Abundance*, *You Are Here* uses video to extract the paths of individuals through the space. In *You Are Here*, video from multiple cameras is digitally stitched to detect movement throughout the entire exhibit floor. *You Are Here* focuses more on literal history than *Abundance*'s abstracted silhouettes. The installation's display and controls are located in the sensed space, and viewers can hide or show the video image and adjust how much history is displayed. The exhibit catalyzes discussion about surveillance, tracking and recording of history in the context of the larger museum exhibit's discussion of computation and technology, in addition to encouraging specific kinds of interactions.

Jason Bruges Studio's *Shortcut* integrates computer-controlled lighting into the pavement of an urban alleyway. The installation senses movement through the alley, and reflects this motion in patterns of light. Rather than encouraging performance or interaction among people present in the space, the installation reflects their motion, building up patterns of light over time. This creates a pleasing interaction in what was previously a dark alleyway, and also improves the safety of the space by providing lighting when people are present. The lighting changes are immediately visible to the participants, but also leave traces for subsequent viewers to interpret.

Mitchel and Seitinger's *Urban Pixels* system supports an interaction where participants use flashlights to trigger individual LED lights, setting off patterns of activity across the other networked devices (Fig. 1, top left) [5]. Like *Shortcut*, *Urban Pixels* responds to human activity with light. *Urban Pixels* has a more flexible spatial layout, and one instantiation requires people to choose to interact with the pixels using a flashlight rather than passively sensing their motion.

Lozano-Hemmer's *Pulse* family of installations, including *Pulse Room*, *Pulse Spiral*, and so forth, use a single tangible object to provoke interaction. By gripping a heart-rate sensor, viewers can contribute their pulse to the installation. Each participant's pulse is visualized as a flickering incandescent light into an array of light bulbs, each representing a participant's heart beat. Lozano-Hemmer uses these captured heart-beats as stand-ins for individual identity, and through this metaphor presents an abstract, ephemeral history of the work's viewers.

Levin et al's *Motion Traces* (Fig. 1, bottom left) uses computer vision techniques to control a projection and multicolored lighting in one corridor of a retail space. The installation presents multiple variants of feedback, each of which maps the position of visitors in the corridor to an abstract video rendering. The system is primarily commercial art -- it serves to entice visitors into the retail space and build positive associations with the brand.

Another tradition of installations considers human motion through public space, without displaying the analyzed motion to the sensed population. Rokeby's *San Marco Flow* fits into this category. Like *Abundence* or *You Are Here*, the installation uses a camera to capture motion through a large public space. Unlike these other pieces, where the generated feedback is visible to the sensed population, *San Marco Flow*'s video feedback exists inside a gallery space. The majority of people contributing sensed motion to *San Marco Flow* may not even realize that they are being sensed.

References and Notes:

1. *Petra Gemeinboeck, "Impossible Geographies of Belonging" (paper presented at the 13th Annual ACM International Conference on Multimedia, Singapore, 2005).*
2. *Erving Goffman, The Presentation of Self in Everyday Life. (New York, NY:Anchor Books, 1959).*
3. *Hiroshi Ishii, Craig Wisneski, Scott Brave, et. al. "ambientROOM: integrating ambient media with architectural space" (paper presented at the CHI '98 Conference on Human Factors in Computing Systems, Los Angeles, 1998).*
4. *Hiroshi Ishii, Sandia Ren and Phil Frei, "Pinwheels: visualizing information flow in architectural space" (paper presented at the CHI '01 Conference on Human Factors in Computing Systems, Seattle, 2001).*
5. *Susanne Seitinger, Daniel S. Perry and William J. Mitchell, "Urban pixels: painting the city with light" (paper presented at the CHI '09 Conference on Human Factors in Computing Systems, Vancouver, 2009).*
6. *Viégas, Fernanda, Ethan Perry, Judith Donath, and Ethan Howe. 2004. Artifacts of the presence era: Visualizing presence for posterity. Los Angeles, CA.*

SYNCRETIC SOCIAL AGENCY: DETERRITORIALISED ROBOTICS AND MIXED REALITY DATA TRANSFER SYSTEMS

Julian Stadon

This paper adopts a syncretic approach to the gathering of disparate beliefs and ideologies in order to expand on the topic of anthropomorphic representation in order to deconstruct our relationships with agents and the architecture of autonomy.

Focusing on networked agency this investigation seeks to articulate the need for dialogue in anthropomorphic social robotics to include, in order to fully understand the breadth of relationships, particularly their effect on consciousness and identity. In this paper I refer to the notion of agency rather than the field of robotics as I believe the notion of servitude applies even to the most advanced artificially intelligent autonomous robots. Citing examples of research from the fields that include media art, telematic robotics, real time digital simulation and mechatronics, this is an attempt to analyse hybridized agency in mixed reality data transfer (MRDT) systems that follow a Deleuzian paradigm of intuitive deterritorialisation and reterritorialisation of the body in real time situations.[1] Second order cybernetics was very successful in its endeavor to explain our early relationships with robots in terms of interactivity and connectivity however the incorporation of more networked systems of autonomous/anthropomorphic based interactions have created a system of agency that is less anchored in a traditional bio-physical/electro-physical dichotomy.[2]

It is a popular belief that we are now, through a media convergent, participatory culture (integrated socially through a subnet of platforms) creating a collective intelligence that exists in this global village of knowledge (data) transfer.This perspective evades mythological notions of anthropomorphic interaction. Networked robotic systems that use real time MRDT expand autonomous robotic interaction beyond traditional bio-physical/electro-physical relationships and are integral to understanding our relationship with autonomous agents. Adopting a syncretic approach to this discourse allows for the inclusion of social networks in dialogue concerning social robotics. Syncretism has traditionally been regarded as an attempt to harmonise and analogise disparate ideologies, socio-political views and fields of inquiry. Unlike traditional sites for communication and cultural exchange, social digital platforms rely on actions and conversations to shape not only the social and cultural environments, but also the spatial environments. Such systems allow participants to physically interact with virtual (deterritorialised) biological representations and mediate (reterritorialise) through physical engagement, rather than entering traditional text or numerical based data sets and command sequences.

Robots have always questioned our stance on expressive cultural and spiritual engagement; particularly the social implications of the human-machine synergies have arisen through their development. Robotic development has generally resulted in a significantly anthropomorphic output, that fits nicely into traditional notions of agency and recent sociable robotic development is no difference. Even within the field of artificially intelligent robotics a dichotomous paradigm of 'otherness' (master/servant owner/pet child/friend etc.) still serves as the best model to explain our relationship with these machines. This is due to the very physical nature of both entities involved in the system.

Thorough analysis of this traditional cybernetic relationship exists in the work of Donna Haraway and Katherine Hayles that is specific to the integration of humanity with machines. Haraway relates the body's augmentation through digital technology to the notion of the social cyborg. In *A Cyborg Manifesto* [3] she argues that the body can be viewed as a conglomerate where its components can be separated, combined with new elements and put together again in ways that violate its traditional boundaries. This rhetoric implies a fractured identity that articulates a cyborg reality that is socially inclusive. *In Chaos Bound* literary theorist N. Katherine Hayles refers to the notion of dispersed self in light of virtual bodies and narrative, arguing that by turning bodiless information into narratives, the teleology of disembodiment is replaced with contests with ambiguous outcomes: "As I have argued, human being is first of all embodied being, and the complexities of this embodiment mean that human awareness unfolds in very different ways than intelligence in cybernetic machines. Stelarc expresses a more dramatic response claiming,

"Evolution ends when technology invades the body. It is no longer of any advantage either to remain "human" or to evolve as a species. Human thought recedes into the human past. The end of philosophy, the end of the human form." [4]

These views seem to predate the integration of networked technologies within robotic systems, particularly mixed reality data transfer systems. They also are situated in a humanist paradigm that tends to neglect the other species we coexist within these realities. Of course recently Stelarc has shifted his research into networked agency with his Prosthetic Head project. This is an example of how even AI agent systems rely on human engagement still in order to be meaningfully experienced. In the work Stelarc argues that against the metaphysical notion of mind/body separation, declaring the mind to be no more an agent than the body. The work forms a metaphorical network through its intrinsic association with Stelarc's identity through its similar semblance and behavior to Stelarc. It is in affect a post-biological mixed reality system of data transfer that acts both as agent for the audience and for Stelarc's ongoing performative exploration of the relationship between mind, body and machine.

Networked agency shifts user-agent relationships into a new era that I believe to be far less autonomous than the physical output of such systems suggest. It is ironic that we often think of non-physically present environments (cyberspace, nanospace and psychic/apparitional space) as virtual realities or alternate/other realities, considering how hybridized they all are, through their ability to transfer data in an interconnected, intercommunicated way. For example I cannot take a rock and combine it with water to create ice in an eco-space, however I can translate an image of a rock into code, cut and paste in the code for an image of water and hybridize the data, which I can then use to create anything from a sound wave to a calibration for a freezer in order to create ice. It is important to remember the fluidity of data as it allows for new media that deconstructs and reconstructs information in a way that can articulate the entire spectrum of wet and dry, natural and artificial, embodied and distributed, tangible and ephemeral, visible and occult. [5]

In order to understand the context of this paper we must first analyse the architecture of autonomy. In the increasingly reliable Wikipedia is suggests autonomous robotics as:

"…robots that can perform desired tasks in unstructured environments without continuous human guidance. Many kinds of robots have some degree of autonomy. Different robots can be autonomous in different ways. A high degree of autonomy is particularly desirable in fields such as space exploration, cleaning floors, mowing lawns, and waste water treatment." [6]

If one believes that these are indeed the tasks allocated to autonomous robots by definition it appears as though autonomous functions are by nature arbitrary and in no way contributing to a rich cultural discourse.

An example of a current research project that conflicts with this statement is being conducted at the Robotics and Mechatronics Centre (RMC), German Aerospace Centre. This projects developed a real-time interactive simulation and training environment used as a platform for the analysis, training and programming of on-orbit servicing tasks. Basically it is a real time haptic mixed reality data transfer system that can control robots in space. By networking haptic-enabled virtual telepresence with it, the robot does in some sense lose its autonomy, however both user and agent are able to work independently of one another in a hybridized fashion to complete tasks. It is similar to a NASA astronaut receiving commands from mission control and carrying them out, however in this case the data is transferred in an intuitive real time mixed reality state. [7]

Clearly there are experiential differences between the two and one allows for a much broader social engagement in a process usually limited to a few highly trained individuals. It also alleviates the physical conditioning usually requires to perform such tasks. Here the robot is very much the agent friend of the user as it helps them perform far beyond their biological realty, and therefore it is post-biological.

Post-biological, in this sense, refers to a redefinition of the embodied subject which encompasses their location in virtual environments as well as in the physical. This involves the creation, through art practice, of what we might term autonomous agents that are born from data but which take on the appearance of bio-forms and thus *become* embodied. At the same time these agents are a differential embodiment of the 'bodies', which first generated that data in their everyday activities.

Another way of looking at autonomous architecture is the cybernetic paradigm of action/response. The father of cybernetics Norbert Wiener describe this model in regards to how messages are communicated between involved entities in systems:

"... society can only be understood through a study of the messages and communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever increasing part." [8]

Recent developments in the way we access networks require this statement to be revisited as systems are becoming more universally accessible and interacted with. Our participation in metaverses such as Second Life, and social networked cyberspaces such as Facebook, Twitter, Youtube, Blogs and Wikis serve as a precursor to our collaborative, hybridized colonisation of post-biological space. Soon we will live in a society of second order presence and identity that endlessly creates and distributes various representations of ourselves under a collaborative paradigm of socially inclusive construction. These systems link traditional virtual and biophysical systems in a way that allows free public access and contribution.

In Leonardo Educational Almanac vol.5, N. 5, May 1997, the notes of Eduardo Kac and Marcel.li Antunez Roca decided that robots were:

"… a new art form and they are prone to be hybridized with diverse technologies. This quality makes them transcend the category of object to be diffused into the environment…Robotic art can occur in physical places, in telematic space, in virtual environments, or any combination of these that includes an actual location." [9]

This definition provides a much more expansive outlook on the spatial presence of autonomous robots, but more importantly it alludes to a hybridized technological engagement that is reliant on networked interactions. A good example of such a system is Ken Goldberg's Telegarden. The work depended on telerobotic users to tend the garden. Web users could view and interact with a remote garden filled with living plants, being able plant, water, and monitor the progress of seedlings via the tender movements of an industrial robot arm. The very life of a living community depended on networked transfer of data to an agent that facilitated the tasks necessary to maintain life.

The final aspect relation to the structure of autonomy is latency in open systems of engagement. All cybernetic feedback systems endure what is known as time-space inconsistency. This is the spatial difference between user and agent and occurs due to latency, bandwidth speed, the paths chosen for data transfer to occur to name a few examples. This creates a deterritorialised autonomy in that a potentially infinite number of users can participate with agents in this 'gap'. It is in this ambiguous space that robots can truly become autonomous as they are free within the network, emancipated of control and alleviated of the responsibility to respond. While computer scientists detest the effect this has on functionality, artists should embrace this in between space. It is a new millennium version of the gap between painting and viewer, representation and ideas, but it goes beyond dichotomies. It is forever expansive in it's invitation to be engaged with.

Edward Shanken published a very thorough overview of telerobotics: *NeMe: Tele-Agency: Telematics, Telerobotics, and the Art of Meaning* in which he describes a range of artworks that push the boundaries of the field. In his conclusion he discusses the difference between active-active and active-passive models of agency:

"This nomenclature emphasizes the difference between those models without burdening the issue with the ethically loaded terminology of "master" and "slave" which is pervasive in the robotics literature. But that such terms can be recycled as though depoliticized from any real-world considerations demands further reflection."

This master-slave metaphor is one that is being replaced by peer to peer through the autonomous appearance of intelligent robotic systems. A dichotomous system I would like to compare this is to a recent model developed for a digital simulation research project by Kashif Zia, Andreas Riener and Alois Ferscha at Johannes Kepler University this year. A simulation of an evacuation situation was established at Linz train station in order to analyse cognitive decision making in socio-technical systems. [10] Participants were asked to wear sensory impaired items such as blindfolds and ear muffs while being dictated by a 'Lifebelt- a technology designed to assist in such situations. The resulting data indicated an exchange system orientated around fear and hope, both existing as feedback loops that are directly relational to intension, emotion, belief and individualism. All of these are linked to the reliance and trust one has on networked technology and the intelligence that exists at the other end of the data transfer.

Lev Manovich expresses this new relationship with technology as a migration from "the orgy of electronic cables" to a state that is

"…completely integrated and fused with the lived environment…neither threatening nor is it some outside force that has been domesticated. Rather, it is playful and playable: it brings a party to the everyday". [11]

So taking what has been discussed into consideration how do we then define our relationships with anthropomorphic agents in real time data transfer systems that traverse multiple worlds, ideologies and realities? First we must understand the structure of such relationships and Deleuze and Guattari do very well to relate scientific discourse to such social structures. In *Difference and Repetition* Deleuze introduces the notion of deterritorialisation (through dispersion) as a "dark precursor" that "relates heterogeneous systems and even completely disparate things." In order for deterritorialisation to occur there must be some form of agent that can remain constant and self-referent. Deleuze and Guatarri state that: "The alignment of the code or linearity of the nucleic sequence in fact marks a threshold of deterritorialisation of the "sign" that gives it a new ability to be copied and makes the organism more deterritorialised than a crystal: only something deterritorialised is capable of reproducing itself." [12]

Anthropomorphic agency's hybridization with physical and biological architecture is constructed by the methods used to connect the environments. The combination and cohesion of heterogeneous elements is generally problematic, particularly when a three dimensional space is primarily viewed on a two dimensional plane. The integration of virtual elements and physical environments rely on bridging disparate with dynamic so that are simultaneously accessible and able to be openly engaged with, edited and developed.

References and Notes:

1. *Deleuze and Guattari, A Thousand Plateaus*
2. *Ascott Syncetic Dialogues*
3. *McLuhan, Extensions of Men*
4. *Haraway, 1991,Simians Cyborgs and Women, The reinvention of Nature, p.149-181 Routledge, New York*
5. *Hayles, N.K. (1990). Chaos Bound: Orderly Disorder in Contemporary Literature and Science. Ithaca, New York. Cornell University Press*
6. *Stelarc, 1986. 'Beyond the Body: Amplified body, Laser Eyes and Third Hand inTheories and Documents of Contemporary Art; A Sourcebook of Artist's Writings. University if California Press, Berkeley, pp. 426*
7. *Ascott, 2010. Syncretic Dialogues. Keynote Presentation at TIIC 2010*
8. *http://en.wikipedia.org/wiki/Autonomous_robot, accessed on September 9th2011*
9. *Wolff, Preusche, Gerndt, 2011. A Modular Architecture for an Interactive Real-Time Simulation and Training Environment for Satellite On-Orbit Servicing, Proceedings from*
10. *2011 15th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications*
11. *Wiener (1954). Cybernetics in History. In The human use of human beings: Cybernetics and society (pp.15-27). Boston: Houghton Mifflin*
12. *http://www.ekac.org/kacmarcelli.html Originally published on the Web in**Leonardo Electronic Almanac**, Vol. 5, N. 5, May 1997.*
13. *Zia, Riener, Ferscha 2011. Evacuation Simulation based on Cognitive Decision making model in a Socio-Technical System Proceeding from*
14. *2011 15th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications*

STITCHING TOGETHER AN EDITORIAL SEWING CIRCLE

Åsa Ståhl, Kristina Lindstrom, Johanna Rosenqvist & Melin Margareta

Fragmented stories of an *editorial sewing circle* are temporarily sewn together. We thereby explore what public emerged through the combination of two known situations and collectives for sharing, joining, and negotiating stories: the *sewing circle* and the *editorial board*. Although we make texts and textiles public, the focus was also on *being* public – inviting people to become part of the *editorial sewing circle*'s negotiation processes.

Introduction

"I am so angry with you, because you say so many relevant things!"

This SMS was embroidered and published in the magazine Aluma. It was the invitation to collaboratively compose a feuilleton based on participants' text messages. These mobile-phone text-messages were embroidered, shared and negotiated at an *editorial sewing circle* hosted by the authors of this paper at Gallery KRETS in Malmö, Sweden in 2009. The final version of the feuilleton, what was decided in the editorial process, was also published in Aluma. At the last day of the *editorial sewing circle* a *patchwork-seminar* was held at the gallery to discuss editorial boards and sewing circles as historical, professional and artistic practices of storytelling, collaboration, production and power. During the seminar each of the four authors of this paper placed text-patches on the floor, and invited the participants of the seminar to do the same.

Fragmented stories of this *editorial sewing circle* are temporarily sewn together in this paper. We thereby explore what public emerged through the combination of two known situations and collectives for sharing, joining, and negotiating realities and stories: the *sewing circle* and the *editorial board.*

By engaging ourselves in the craft of story-quilting (Bränström Öhman and Livholts 2007), in the seminar and in the writing of this paper, we hope to draw attention to the seams: the things that separate as well as hold together.

Sewing Circle

The first major patch in this textual quilt, trying to reflect upon our editorial sewing circle, is the notion of the sewing circle. What usually defines the sewing circle is the sewing together, be it on individual or joint projects. What is being made public from these gatherings are the products of the decision-making of what should pass as social goods, in all aspects. One example is Church-quilts, traditional communal-products of the village sewing-circle, where the circle of women made decisions of patches of moral stories to be passed-on and told as textile texts, traditionally given as rite-de-passage gifts to girls, thus influencing the social order of villages.

Historically, the sewing circle seems to have been used as a means of disguising power under the cloak of meeting for an ostensibly lesser cause, while really discussing important matters. They have functioned as semi-secret discussion groups, letting the formal power rest in the hands of others. Sewing-societies is another example of a covert public realm where women have turned the unpaid time to benefit the community, for example by auctioning their goods and using the profit to pay for lampposts as well as send money to people in need. It is more open in form than the closed circle and have existed in Sweden at least since 1840. This has been described in several texts by Louise Waldén (1997; 2001). She has written about the cultural history of women, seen through the example of textile crafts, drawing on experiences from the fields of both women's rights movement, technique in connection with social change and handicraft associations.

THE TEXTILE AS TEXT SPELLING OUT SURVIVAL STRATEGIES

In the seminal text "What constitutes powerlessness" Waldén tries to read textile as a text of which the culture and literal heritage have primarily been formulated in a feminine context. She sees two stories. On the one hand a description of textile production marking one the darkest chapters in women's history in terms of exploitation and terrible working-conditions. And – on the other side – as a dignity description of the pride, care and concern for the sparse but treasured textile of the workers home, and linen cupboards of the noblewomen alike. Waldén suggests a third reading style: "Stories of survival strategies under the cover of textile. Being able to read the fabric's text requires knowledge of women's history, condition and culture." Only then, she states, the textile text lends itself to reading. And only then the separatist seclusion can be seen as a refusal to comply to an unequal power structure and a refusal to allow the formal lack of power to be matched by real powerlessness.

UNDER-COVER POWER

History shows us, as told by Waldén, that the sewing circle may be used as an under-cover method to induce power into an unequal power structure. The caricature-like gender-dichotomy is an enlightenment-heritage. What is or was constructed as masculine was per definition the opposite of the feminine. Strong, rational, public sphere, metal craft and art, hard news equal masculine. Weak, emotional, private sphere, textile craft, soft news equal feminine. And the masculine sphere equals everything with high status, while the feminine equals everything with low status (Rosenqvist, 2007; Melin, 2008).

Throughout the twentieth century working with textiles has been professionalised within for example handicraft associations (Rosenqvist, 2007). The connotation to the home and the feminine crafts served as a legitimising factor when women went from working in their own homes to working in the boutiques of the handicraft associations, thus making public some of the chores of the private sphere. The separate sphere can thus be read as a means of under-cover power recognizing the difference, of teaming up with other, like-minded individuals, of forming a meeting-point and a protocol that is defying power.

APPROPRIATED SEWING CIRCLES

One of the many contemporary artists and activists who have used the under-cover method of the sewing circle is Malin Arnell. She hosted a sewing circle as part of an art exhibition in Trehörnahult, Sweden during the summer of 2001. Those attending were women in the neighbourhood, but also random visitors. Arnell created an open space for textile craft and conversation during the entire period. She

states in her invitation: "The invisible is equally significant and important as the visible. I want to feel that I am needed, I want to feel like I am part of a community, and I want equality."

The sewing circle was used for its power to transform private chores and applied craft into public art. The way in which Arnell was touching upon the important aspect of making public was to invite everybody to add to a communal tapestry by embroidering "I feel that I am needed" and sign with their name.

CRAFTIVISM

Crafts in various forms has had an upsurge in the last 15 years. This renewed interest takes different forms – from learning the different techniques to craft activism (Åhlvik & von Busch, 2010). Ele Carpenter (2010) points out that the increasing interest in handicraft also have brought about commercialisation of knitting, which she exemplifies with a surplus of knitted cakes. She argues that the knitted cakes have confused the political intentions of activist craft, which focuses on doing and making things together rather than buying things, locally produced or not. Often these activists are aiming at the public sphere. Knitted graffiti – with the original Knitta Please crew formed by Magda Sayeg in Austin, Texas in 2005 – is one example of the latter (Levine 2008). Knitted graffiti might serve as an example of the advantages – or the critical potential – of working anonymously but more importantly outside the institutions. On their website (www.knittaplease.com) the crew members present themselves under fictitious names as anonymous yet individual parts of a subversive whole – promoting the power of the movement and the strength of the textile metaphors, not the knitters as individuals. Whereas Arnell urge participants to sign their art pieces individually and then put them together, Knitta Please find it empowering not signing communal work at all. In comparison with sewing circles that raised money for new lampposts, groups like Knitta Please knit-in lampposts, financed by the welfare system. These are two different ways of making a mark or acting in the public.

Editorial Board

A second patch in this quilt of understandings of the stitched-together editorial sewing circle is the editorial board. In the field of journalism editorial boards organise and control news production. They put reality together with the help of a hierarchical and bureaucratic news-organisation, and distribute news-products to the public. The tasks of the editorial boards is to get an overview of information, value it according to quality and news-value, then set the production process moving by delegating tasks, so that the information becomes formatted news-products, whether broadcast, printed or digitally published.

POWER AT WORK

Newsrooms and editorial boards are conflict-ridden places of male power-play (eg. DeBruin, Ross, 2007; Melin, 2008). The concept *doxa* can be used to decipher these inherently gendered powered conflicts as doxa, what we believe about the world, ourselves, our attitudes and behaviours – perceived common sense – is what is at stake in these conflicts (Bourdieu, 1998).

The *doxa* of journalism, is what is defined as journalism, what should be news, and how it should be presented, as well as how to do journalism, how to be a journalist, how to interview, dress, act, think as a journalist. In a study of British and Swedish journalism Melin (2008) found strong doxas. In the central

stage was the journalist – a white hetero-sexual, protestant male; a tough guy, slugger and bloodhound, who chases news in order to reveal crooks – all the while being objective and distant. This doxa was lived through decisions made in editorial boards, and reflected in the published news.

STRATEGIES TO STAY IN POWER

A way to understand how dominating players in the field of journalism hold on to the power (to define doxa) and handle conflicts in newsrooms and editorial boards is to use military language. Strategies are used on battlefields by dominating players, who have a power-base, a place from where they use strategies to ward off unwanted others (deCerteau 1984).

Melin found that editors, high-ranking journalists – often male – elite-players on the field of journalism in Britain and Sweden used a number of strategies, such as dichotomising journalism into gendered differences of important hard news and unimportant soft *female* news.

In the UK, Melin found a pub-strategy. The *guys* continued newsroom crude banter, macho jargon and power-play over a pint in the pub. Scottish pubs are by definition masculine places, where few have female lavatories, which makes pubs closed spaces for but the most courageous women. Also, these pubs were the hang-outs of politicians, the very important news-sources journalists seek. Tomorrow's news-stories were thus made in these pubs. Also, as the editors and journalists alike hung out together, tomorrow's editorial boards and morning-meetings were often predetermined in the pub, as was the division of stories and patches.

MEDIA ACTIVISM: PATCHING-UP SURVIVAL-TACTICS

According to Bourdieu the field of journalism is doxic, i.e. there is supposedly only one way of seeing journalism. Not so, argues Melin. She found outspoken and under-cover opposition, alternative ways of thinking and doing journalism, termed *allodoxa* by Bourdieu. There were journalists that questioned newsvalues, and argued that the *important* news are the so called soft (female) news, that objectivity is but a chimera, and that hunting down crooks and chasing after politicians is indeed cowboy-journalism in its worst sense.

GUERILLA TACTICS

In response to the symbolic violence of strategies used by powerful journalists, oppositional groups use *tactics*, which de Certeau likens with guerrilla-warfare. Melin showed that a number of tactics were used by many journalists (mainly women) in order to enter the field, to get a place and a career, indeed to cope in every-day-journalism. Most of these tactics were done with hands above-the-quilt, with raised voices trying to change the very nature of journalism. There were women who tried to be *one-of-the-boys*, who dressed and acted in a manly fashion, cracked sexist jokes and hung out in the pub. They accepted the doxa, with news-values and ways of doing journalism, but opposed the gendered logic of journalism. Many of the best known female journalists in Sweden and Britain have used this tactic, some seen in bullet-proof-vests on television-screens from war-zones all over the world, or known as "hard-nosed" interviewers in high-powered television-programs.

Other journalists (mainly women) tried to change the very nature of journalism, by trying to create spaces where an allodoxic journalism was possible, where the hierarchic newsroom could become an including and creative space, where ethics matter and where subjective and analytical reportages are rewarded, and where other stories could be told. Designated female spaces, like *Women's Page* and *Women's Hour* in Britain and *Idagsidan*, *Freja* and *Radio Ellen* in Sweden are some examples where women created spaces inside news-medium. There are also examples of alternative *medium*, like the Scottish feminist magazine *Harpies and Quines* that was created by some female journalists with negative experience of traditional news-rooms. These, more historic, examples were resource-wise limited. With today's new technology a number of new alternative spaces turn up on the quilt that is the media-landscape. It is now possible for people with allodoxic approach to journalism to create their own blog, or facebook site. *Feministing.com*, *bullybloggers.wordpress.com*, *Feministiskt perspektiv* are but a few examples of such platforms, where journalists and bloggers set up their own agenda and manage to embroider their own versions of reality. And to draw a link to the historic past, Lesely Riddoch, one of the editors of *Harpies and Quines* has created several alternative media, eg. the webpaper *Africa-woman*.

It is important to point out that the tactics found are not static. Indeed they are dynamic on many levels. First, individual journalists changed their tactics over time, according to what best suited their different life-situation. Secondly, groups of oppositional journalists did not simply act in defence. They took specific strategies and turned them around, eg. male journalists have used social networking as a way to keep unwanted others out, thus female journalists created their own network, which has strengthened their positions.

Stitching Together an Editorial Sewing Circle

Let us patch up these different professional and artistic forms for storytelling, collaboration, production and power-relations by looking back at the *editorial sewing circle* that we created at gallery KRETS. Like in most sewing circles we had set the table with cookies, coffee and tea. Together with passers-by, we spent time embroidering, telling and listening to stories. The embroidered messages were temporarily hung on clothes-lines which made it possible to constantly re-write the emerging narrative through moving the messages around.

Both sewing circles and editorial boards relate to the public sphere. But what kind of public was created through stitching them together into an editorial sewing circle? Who were the actors? What were the concerns?

The actors at KRETS ranged from crafts-women, artists, people who wanted to write articles for Aluma, regular visitors to the gallery, our friends and colleagues, as well as passers-by.

Some of the concerns that were brought up during the patchwork seminar were the separation between art and craft, feminist potential of bringing craft into the art world, subversive power of working within areas that are considered of less importance, why and why not separatist groups can be empowering, what is considered newsworthy or of public interest as well as what is dismissed as gossip and hen-talk.

The authors of this text – who are also researchers-artists and perhaps main actors in the editorial sewing circle – have had our own concerns and agendas that ranged from (un)disciplining academia, arts and craft and to create publics.

In our attempt to put research and practices of sewing-circles and editorial boards together, one conclusion is that the survival strategies Waldén refers to have their sibling activity in what DeCerteau have described as guerrilla tactics and we use in the field of journalism. One of our main arguments is that there is a tendency for oppositional groups to appropriate types of strategies used by those in power, and turning them around. On the one hand contexts such as the sewing circle can be used as a power-base to create potentially empowering networks precisely because those spheres are not considered important. And on the other hand things such as handicraft or so called soft news are made more important through bringing them into the public through knitting lampposts as well as creating one's own platforms for publishing. What is termed 'gossip' in sewing circles becomes power-talk, private knitting becomes knitting-graffiti in public spaces, soft, female journalism becomes influential feminist blogs.

When considering what kind of public that emerged through our editorial sewing circle we could make a distinction between being public and making public. In traditional sewing circles and editorial boards the meetings and negotiations that go on in them are not accessible to everybody nor made public. Parts of these negotiations are however more or less explicitly made public through publications, textiles such as quilts or action for change. In our editorial sewing circle one version of the *SMS-embroidery-feuilleton* was made public through publishing it in Aluma. But, the point was not only to make it public, the focus was also on being public – inviting people to become part of the *editorial sewing circle*. In the gallery space we opened up for discussions, negotiations and questions. All of these debates were, however, not made public when publishing in Aluma nor did we make a joint action beyond the editorial sewing circle. In this paper we try to publish and make some of our negotiations accessible.

All formats of narration have their limitations. SMS has its 160 characters. Aluma offered one spread to publish the SMS-embroidery-feuilleton. At KRETS we had three days and two hours for the patchwork seminar, transcribed to about 30 pages. In this paper our action space is 3200 words.

In the welcoming statement at KRETS we noted that there are many voices in the room which are not heard. Some voices are silenced because of the format, comparable to how not everything can be included in an SMS restricted to 160 characters. A risk in writing in the mode of story-quilting is that it looks too smooth, that we work too well with the given format, restrictions and possibilities. How can you as a reader distinguish the four authors' voices? Is the unified yet separate voice escaping accountability? Who is responsible for the choices made in the process of writing this? Is it necessary to know in this context? One suggestion when reading this text is to pay conscious attention to the seams, to see what separate and hold together the patches. And, perhaps, with Waldéns words, the reading of the seams and patches require knowledge of certain women's histories, conditions and cultures.

Throughout this story-quilting-project we have acted in already existing publics, such as a magazine, a gallery and an academic conference. In those established spaces we have also created our own public*s* by re-negotiating the forms of the existing, such as the sewing circle, the editorial board and the feuilleton. Thereby we have been working both within the power and also created action spaces.

References and Notes:

1. *Pierre Bourdieu, Om televisionen (Stockholm: Brutus Östlings, 1998).*
2. *Annelie Bränström Öhman, and Mona Livholts (eds), Genus och det akademiska skrivandets former (Lund: Studentlitteratur 2007).*
3. *Ele Carpenter, "Activist Tendencies in Craft" (2010) At: http://eprints.gold.ac.uk/3109*
4. *Michel DeCerteau, The Practice of Everyday Life (Berkely: University of California Press, 1984).*
5. *Marijan DeBruin and Karen Ross (eds) Gender and Newsroom Cultures. Identites at Work (Creskill: Hampton Press, 2004).*
6. *Faythe Levine and Courtney Heimerl, Handmade Nation (Princeton: Architectural Press, 2008).*
7. *Margareta Melin, Gendered Journalism Cultures. (Göteborg: JMG, 2008).*
   Johanna Rosenqvist, An Aesthetics of Sexual Difference? On Art and Artistry in Swedish Handicraft of the 1920s and 1990s. diss. (Lund university, 2007).
8. *Louise Waldén, "Vad konstituerar maktlöshet? läsövning i textilens text" in Report for the Committee on the Distribution of Economic Power and Economic Resources between Women and Men, (Stockholm: Swedish Governmental Report 1997:113).*
9. *Louise Waldén, "Female - male, textile - technical: transforming culture" in Upholders of culture: past and present, ed. Bosse Sundin, (Stockholm, 2001).*
10. *Clara Åhlvik and Otto von Busch, (eds.) Handarbeta för en bättre värld,(Jönköpings läns museum, 2009).*

NEW MEDIA AND EXHIBITION MAKING: SOME FORECASTS

Jasmin Stephens

While 'trophy' new media works have been readily absorbed into traditional institutional formats and have contributed to the attraction of larger and more diverse audiences, curators must continually strive to counter the weight of inherited exhibition protocols if visitors are to engage with emerging technologies in their fullest artistic sense – as subject, methodology and medium.

The attention given by the art world to 'new media' has recently escalated as evidenced by the more and more technically ambitious viewing experiences that are being staged by its institutions for our edification and delight. This 'turn' in exhibition making towards the kinaesthetic has coincided with the rise of neurological accounts of perception which are not only being popularised in all aspects of culture but which artistic organisations are now seeking and expected to apply in their civic roles as leaders of individual and collective creativity, learning and well-being.

Exhibition practices in general also reflect a re-emergence of a sense of wonder and the recuperation of non-logic based knowledge systems in the world's dominant societies. New media works which are prized for their 'immersive' and 'interactive' attributes are being installed in ways that set up a 'magical' space in which there is a disarming effect that offers a respite from 'disbelief'. Cultural and intellectual trajectories that are re-asserting a relationship to nature that emphasises the confluences between nature and technology are informing the practices of many of these artists.

The presentation of new media works is influencing the overall design of exhibitions. There has been a move away from the sparse exhibition layouts that reached their zenith with last century's High Modernism. The trend has been towards more crafted, theatrical spaces. Whether it is architectural practitioners being curated into biennales to stage interventions in the built fabric of the exhibition or the alignment of museum attendance with the 'experience economy' of leisure and shopping, institutions of all complexions are imagining the 'space' of the exhibition far more intently.

Exhibitions are being increasingly understood as sites of interchange in which the processes by which artists conceive of the reception of their work are built upon. Much curating is now predicated on the assumption that the relationships that coalesce around exhibitions are constantly shifting and is being explicated to varying degrees within exhibitions. In some cases, the distinctions between the production, presentation and the reception of work are blurring so that the notion of the exhibition is being simultaneously conceptualised as more fundamental and as more contingent across the art world.

The greater efficacy that is being ascribed to the form of the exhibition has meant that major institutions are committing larger and larger amounts of resources to their realisation, arguably to match mounting visitor expectations. In order to secure 'trophy' works, they are entering into joint commissioning and acquisition relationships with each other, and are re-developing their sites to accommodate them.

These kinds of works are being absorbed into traditional institutional formats while also contributing to the adaptation of these conventions to successfully attract larger and more diverse audiences. At the same time, the most spectacular of the works occupy a position in their institutions that has an equivalence to the status accorded 'old masters'. Often held up as evidence of an institution's contemporaneity, these works can be readily sidelined from an institution's necessary contestatory processes and have a consensualising effect because of the collective relief that accompanies 'everyone loving them'.

Consequently, they are installed so that there is an over-emphasis on their effect. My experience of volunteer and professional staff in galleries being able to explain transfer processes used in printmaking but not in digital works reflects the manner in which organisational factors support this 'splendid isolation'. In instances in which works are installed without the provision of a nuanced context that includes considerations of criticality, they can function in the manner that venerated objects were and still are displayed.

In such situations, curators continue to be highly selective in the way that they work with artists engaging with the materials and vocabularies of emerging technologies. These artists have practices that are performative, participatory, take up user-generated content, posit continuities between physical and virtual spaces, and arise out of a distributed rather than a single sensibility. Curators establish a dialogue with the object-based strands of an artist's practice while avoiding the less traditional aspects. More commonly, they present durational or relational aspects in such a way that audiences mistake them for documentation or interpretation of the artist's practice. Their curatorial approach cannot accommodate artists and audiences who insert themselves into the interpretative dimension of exhibitions. Even with the best intentions, the market will champion and audiences will continue to defer to the object unless curators continually strive to counter the weight of inherited exhibition protocols.

Exhibition formats have not kept up with the aspirations of many artists working in new media and traversing disciplines. These artists range across the formerly discrete sites of the studio, laboratory, workshop and gallery so that these locations become the spatial coordinates of an expanded field of relational energies. These energies are unwieldy and dispersed in character and do not observe opening hours. While compelling they are extremely difficult to curate into exhibitions. Nevertheless, artists of all persuasions continue to want to be in exhibitions no matter how critical they may be of institutions and audiences are drawn to this enduring form.

As institutions expand the range of technologically inflected practices that they present, visitors increasingly encounter technology in its fullest artistic sense - as subject, methodology and medium. It becomes more possible for the arresting sensations associated with new media installations, for example, to be positioned closer to rather than parallel with the complexities of networked digital technologies in our lives. The limitations of terms such as 'affect', 'perception' and 'attention' that have rapidly solidified around the term 'new media' can be tested as practices engaged with the technologies and perspectives of web 2.0 generate a raft of responses that cannot be summed up as either scopic or embodied. The mainstream art world's reliance on binary distinctions that simplistically associate 'contemplation' with the 'cognitive' and 'interaction' with the 'affective' can be more thoroughly questioned.

It exceeds the scope of this text to analyse where and why these cultural and institutional and ultimately aesthetic shifts are underway. My observations have arisen out of a practice that upholds the distinctiveness of the curatorial role and the form of the exhibition - although now extending beyond

gallery walls to encompass off-site and online spaces. Many exhibitions of new media work would be more incisive if there was greater investment in the relationship of curators and artists. As well as the technical skills associated with framing and facilitating a context for artists' work, curatorsbring historical, theoretical and audience considerations to the attention of artists in their ongoing relationships with them.

There is crucial work to be done to ensure that media artists are not cut off from opportunities associated with the market, critical writing and publishing. Curators have the capacity to assert the value of the small scale, the modest and the ephemeral whilst attending to the currency of spectacle and the spectacular in contemporary art. New approaches to exhibition making that allow emerging strands of practice to interpolate the discourse of aesthetics and that contribute to debate about what sorts of criteria traditionally associated with connoisseurship should be applied to new media are needed. Curatorial strategies have fallen too far behind theoretical discussion about the relationship between contextually-generated work and artistic considerations.

The form of the exhibition is, of course, culturally loaded and highly codified. With scrutiny, however, evolving exhibition formats can continue to do what exhibitions do best which is to link the display of artists' work to branches of philosophy such as aesthetics and ethics by stimulating curiosity and enjoyment, engendering contemplation, and fostering a sense of history and society. These convictions should in no way determine what exhibitions look like. It is about what they do. (1)

References and Notes:

(1) This text has been published as a companion to an illustrated presentation given during ISEA2011 that included examples of exhibitions. The research conducted within Australia and travel to Istanbul was supported by the Western Australian Department of Culture and the Arts. Additional research was undertaken as a Visiting Curator and Asialink Arts Management Resident during Singapore Biennale 2011 with support from the Department of Culture and the Arts and the Australia Council for the Arts.

@JUSPAR[1] AND NOW QUOTING GALLOWAY[2]: "CODE IS THE ONLY LANGUAGE THAT IS EXECUTABLE". DOES WHAT IT SAYS. #CODE #CHUN[3] #NETPOL1010[4]

Igor Stromajer

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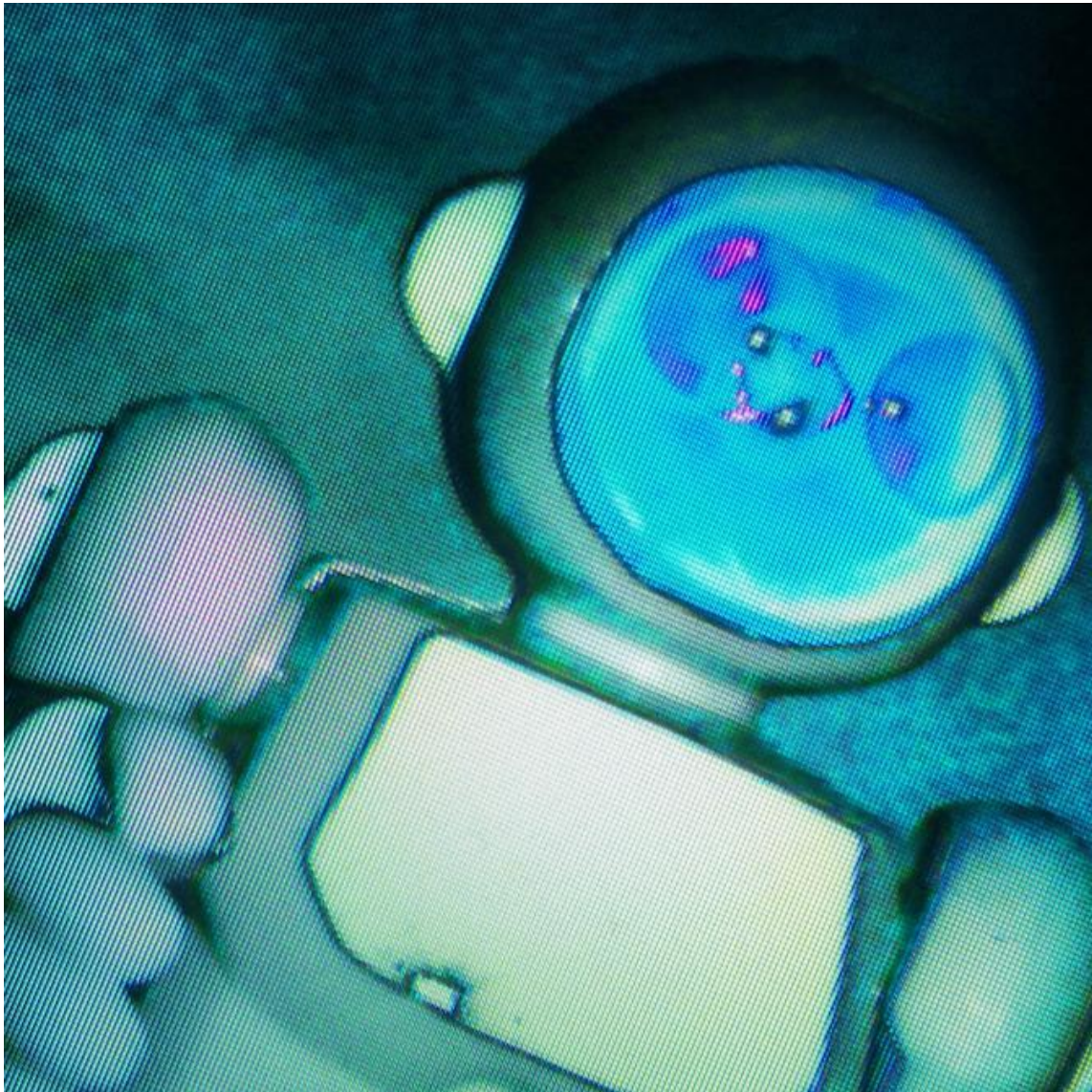
01010100 01101000 01100101 00100000 01010010 01101111 01100010 01101111 01110100, 2011, Igor Štromajer, photographic media, Copyright Igor Štromajer.

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t!tle="favor!te th!s tweet"0 0/a0 0/d!v00/s0 0s c="entry-n"0Never m!nd the cloud – ce to Oslo: "One f!ne day, all th!s w!ll be yours" by Dellbrügge & Moll (23 Apr, 18:00) 0ah=":w.cmonlands.net" c="tweet-url web" rel="nofollow" target="_blank"0:w.cmonlands.net0/a00/s0 0/s0 0s c="meta entry-meta" data='{}'0 0a c="entry-date" rel="bookmark" href=":tw!tter.c/!nt!ma/t/12507709483"0 0s c="publ!shed t!mestamp" data="{t!me:'Tue Apr 20 09:53:38 +0000 2010'}"011:53 AM Apr 20th0/s00/a0 0s0v!a web0/s0 0/s0 0ul c="act!ons-hover"0 0l!0 0s c="del"0 0s c="delete-!con !con"00/s0 0ah="#" t!tle="delete th!s tweet"0Delete0/a0 0/s0 0/l!0 0/ul0 0/s0 0/l!0 0l! c="hentry u-!nt!ma m!ne t" !d="t_12476819178" 0 0s c="t-body"0 0s c="t-n"0 0s c="act!ons"00d!v0 0a !d="t_star_12476819178" c="fav-act!on non-fav" t!tle="favor!te th!s tweet"0 0/a0 0/d!v00/s0 0s c="entry-n"0RadarV!rtuel.c – real-t!me l!ve fl!ght/a!rcraft traff!c (w!th the volcano ashes layer) 0ah=":w.radarv!rtuel.c" c="tweet-url web" rel="nofollow" target="_blank"0:w.radarv!rtuel.c0/a00/s0 0/s0 0s c="meta entry-meta" data='{}'0 0a c="entry-date" rel="bookmark" href=":tw!tter.c/!nt!ma/t/12476819178"0 0s c="publ!shed t!mestamp" data="{t!me:'Mon Apr 19 21:28:07 +0000 2010'}"011:28 PM Apr 19th0/s00/a0 0s0v!a web0/s0 0/s0 0ul c="act!ons-hover"0 0l!0 0s c="del"0 0s c="delete-!con !con"00/s0 0ah="#" t!tle="delete th!s tweet"0Delete0/a0 0/s0 0/l!0 0/ul0 0/s0 0/l!0 0l! c="hentry u-!nt!ma m!ne t" !d="t_12446865114" 0 0s c="t-body"0 0s c="t-n"0 0s c="act!ons"00d!v0 0a !d="t_star_12446865114" c="fav-act!on non-fav" t!tle="favor!te th!s tweet"0 0/a0 0/d!v00/s0 0s c="entry-n"0[repose from to!l]0/s0 0/s0 0s c="meta entry-meta" data='{}'0 0a c="entry-date" rel="bookmark" href=":tw!tter.c/!nt!ma/t/12446865114"0 0s c="publ!shed t!mestamp" data="{t!me:'Mon Apr 19 09:27:48 +0000 2010'}"011:27 AM Apr 19th0/s00/a0 0s0v!a 0ah=":w.p!ng.fm/" rel="nofollow"0P!ng.fm0/a00/s0 0/s0 0ul c="act!ons-hover"0 0l!0 0s c="del"0 0s c="delete-!con !con"00/s0 0ah="#" t!tle="delete th!s tweet"0Delete0/a0 0/s0 0/l!0 0/ul0 0/s0 0/l!0 0l! c="hentry u-!nt!ma m!ne t" !d="t_12413728534" 0 0s c="t-body"0 0s c="t-n"0 0s c="act!ons"00d!v0 0a !d="t_star_12413728534" c="fav-act!on non-fav" t!tle="favor!te th!s tweet"0 0/a0 0/d!v00/s0 0s c="entry-n"0Ballet mecan!que (1924) Fernand Leger / Part 1: 0ah=":b!t.ly/ICBF2" c="tweet-url web" rel="nofollow" target="_blank"0:b!t.ly/ICBF20/a0 & Part 2: 0ah=":b!t.ly/6sCbtD" c="tweet-url web" rel="nofollow" target="_blank"0:b!t.ly/6sCbtD0/a00/s0 0/s0 0s c="meta entry-meta" data='{}'0 0a c="entry-date" rel="bookmark" href=":tw!tter.c/!nt!ma/t/12413728534"0 0s c="publ!shed t!mestamp" data="{t!me:'Sun Apr 18 19:31:47 +0000 2010'}"09:31 PM Apr 18th0/s00/a0 0s0v!a web0/s0 0/s0 0ul c="act!ons-hover"0 0l!0 0s c="del"0 0s c="delete-!con !con"00/s0 0ah="#" t!tle="delete th!s tweet"0Delete0/a0 0/s0 0/l!0 0/ul0 0/s0 0/l!0 0l! c="hentry u-!nt!ma m!ne t" !d="t_12298164403" 0 0s c="t-body"0 0s c="t-n"0 0s c="act!ons"00d!v0 0/body0 0/html0

References and Notes:

1. *Jussi Parrikka*
2. *Alexander R Galloway*
3. *Wendy Chun*
4. *Jussi Parrikka, "@juspar," Twitter, October 22, 2010, http://twitter.com/#!/juspar/status/ 28433378847 (accessed August 21, 2011).*

CYVERS CITY

Susana Sulic

This work is a reflection of a poetical-scientific cosmology. Two new worlds: a macroscopic one and an invisible one develop before our eyes. The objective for this work in progress is to use a generative grammar, in using a similar grid as the one used in biotechnology. The general meaning of my project is that with Cyvers: poetry and techne, we can change the world.

Fig 1.Cyvers 2011, 2011, Susana Sulic, photographic media, copyright S S ALAP.

Fig 2.Cyvers Times, 2011, Susana Sulic, photographic media, copyright S S ALAP.
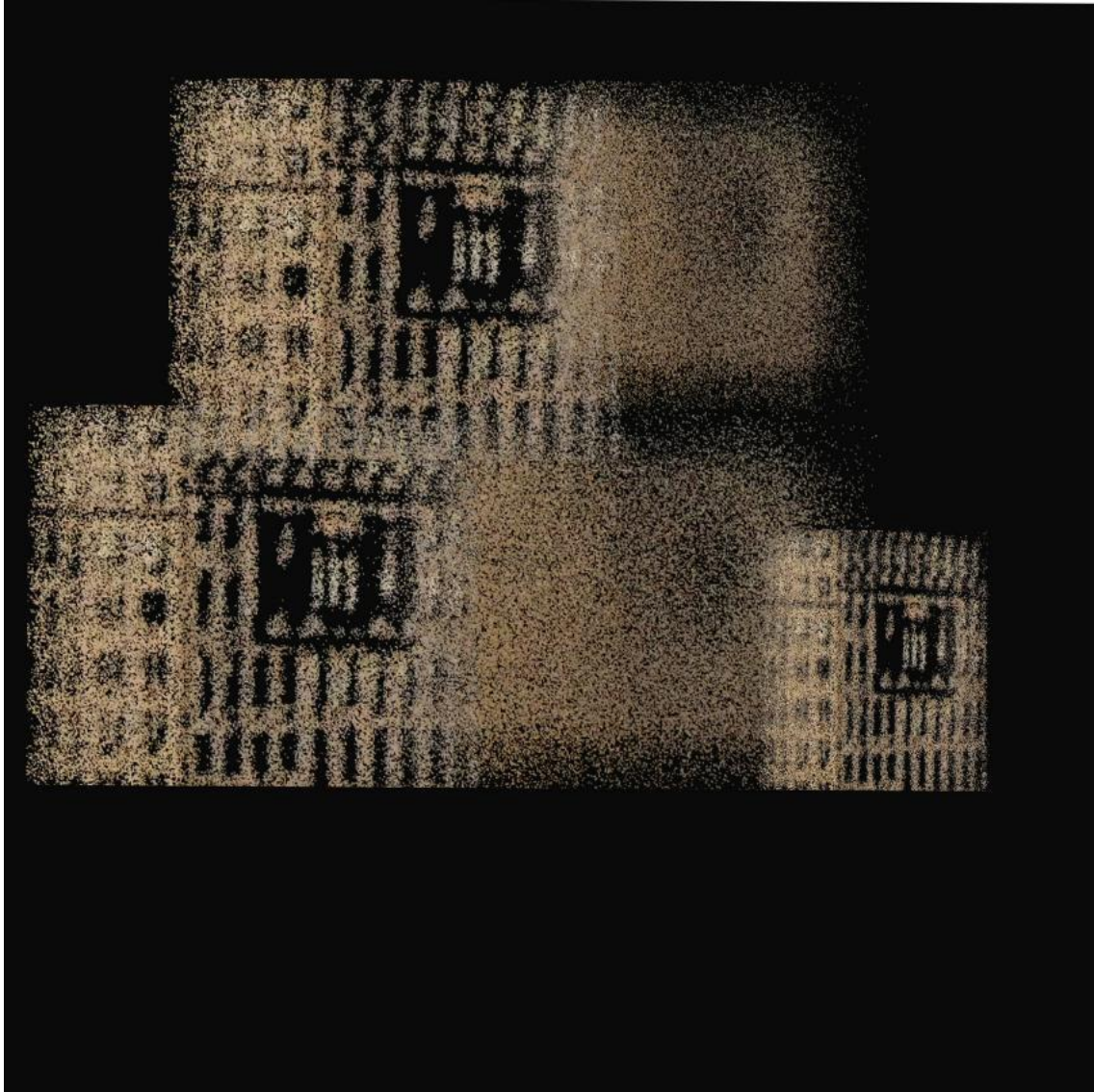
Fig 3.Cyvers carre, 2011, Susana Sulic, photographic media, copyright S S ALAP.

Cyvers city

INTRODUCTION

Cyvers is a synthesis of morphogenetics and physics contents, built after a process of research and multidisciplinary practice.

Cyvers is a concept I created to identify the relationship between poetry and technology in the cyberspace. Cyvers is a configuration of different words from french and english: verset, cyber, vers, verse, poetry and towards.

'Poiesis' and 'tekhne' form a loop in a digital feed-back and both synthesize the actual language of a digital civilization. It is also in this way that the neuronal network can be compared as a cloned weaving of a merging cyber - poetical - culture.

With cyber-space and cyber-electronics, we should reach the immersive environment, the synthesis of this huge totality of meaning and sensor-perception, sensitive knowledge in a high level of poetical substantiation. In this conception of technological art the consciousness is like a permeable skin.

It can be cloned and cultivated in a new extended gene-poetical way which would be the result of the development of technology.

CYVERS PRACTICE

The objective for this work in progress is to use a generative grammar, in using a similar grid as the one used in biotechnology.

This work is a reflection of a poetical-scientific cosmology. Two new worlds: a macroscopic one and an invisible one develop before our eyes. The values of technology and plasticity are questioned by a different sensitivity.

According to Plato, poetry is the principal exercise, a primordial practice: to produce, to build and to construct are synonyms of poetry. For Aristotle tekhné-poïetiké is an autonomous art.

Poetic is a field of creation and composition of works. In literature is a question of language, that it is at the same time the substance and the medium. But as far as we consider the development of the technology, we agree that we are at the beginning of a new approach.

The conjunction of science and human cleverness with intelligent machines and environments are the new windows that with the biggest open eyes let us go further in information and experience. In the global era, cyvers is a synthesis of morphogenetics, physiological, chemical and physics contents. As far as the human being increases his own capacity of transforming the world, new ways of perception and understanding arise.

But it is also creating new perceptions with haptic interfaces searching also for or synesthesia or new introspective meanings

Which can produce a challenge concerning the poetics contents.
DNA, virus and bacteria are considered actually normal subjects of art. The borders between visibility in invisibility are closer.

The bio-technology goes beyond the machine in the global society era and is an implement of war, an artistic tool, a philosophical reflexion, and has an unlimited capacity of mutation. There are artistic subjects that find its mutation between sign, image, text and the significant. The images mutation is also related to the epidemics that motives the scientific environment.

Receiving a digital feed-back we can also explore and activate an understanding of our cyber culture as an extended mind in a poetical way.

Looking for a total art work conceiving bio-cybernetic windows we've just abandoned the linear conception of both thinking and understanding. We've just gone further with the fractal movement, but with the quantum leap we are nearer of the qualitative jump.

The spectator travels from the past to the contemporary time and from the present to the virtual space.

Two radical revolutions allows us to enlarge the vision of our global world and open the door of a new scientific imaginary. Connexions between disciplines such as biotechnologies, physics and art are what need to be represented by making immaterial artworks located in the abstract space of communication.

As a result of these formal works, I become aware of a complex web, the cybernetic polyptic where each one can explore and experiment with the concept of expanded cyvers poetry. For these creations the events don't occur as a succesion, thus it is necessary to introduce a different concept of time. The related texts have no logical grammar, but a fragmented one, acquired through a cyber immersion determined by the perception and the role of the observer as co-author, as I mean.

While the arts and the topology of texts change, according to the observer, the narration opens itself to a natural fragmentation.

With the application of an algorithmic- poetical language, we reach the essential meaning of cyvers 1. That it means not only to write verse or poetry in a configuration of different words but also to behave, to act. From the text on the base, a peculiar dynamic in which the words are transformed into images is generate: letters, pixels, viruses, molecular and nano-structures melt in an hypothetic city.

Movements of evolution and degradation emerge from the text in a non-linear space-time, in an extra-temporal text-space. The spectator travels from the past to the contemporary time and from the present to the virtual space. Images are mixed with the words and therefore produce a poetical and scientific decontextualisation.

The decyphering of the genetic code as well as new applications such as the clonage of cells in order to create living creatures, show us the way to what seems to be essential components to understanding of the biological world.

I apply a formal genetics connecting living matter: as the objective is to create a kind of generative grammar, in using a similar grid as the one used in biotechnology. In my project *Autophagocytation* (1995-97) work in progress, the images are considered like informational ecosystems: they are generated by the activity and the movement of artificial entities. Cyberspace is a space where the self is manipulable: an intellectual artefact.

The human body is reconstructed through technology.

A result of these manipulations and process is the cyborg.

The cyborg can be defined as a kind of hybrid between human and machine where technology replaces and supplements the body, its flesh, its membranes, its tissues.

The so-created body-character endures several metamorphosis through a virtual space grid. In the literary text which is on the base: passing from one space to another transforms the character from actor to narrator. Each cell metamorphosises into a block, each block into pixels, and from these to a building. The text changes its topology like rotating windows. The verticality and the point of view evolves and the narration opens naturally to fragments. The sequences- pages- or better, the screen- sequences produce an open vision.

Following a temporal flux, we wander from one space to another through cybernetic windows. The text has no logical grammar, but a fragmented one, acquired through a cyber hypnotic immersion and poiesis. Poieetikee is the art of composing. Poetry and techne converge and generate cyvers poetry: the whole global-world is translated in algorithm like the projection of an expanded universe.

Those stories reflect a poetical - scientific cosmology. Two new worlds: a macroscopic one and an invisible one take life under our eyes. The values of technology and plasticity are questioned by a different sensitivity: a techno- scientific sensitivity in plastic arts is revealed. Science becomes a poetic: notions of dream and unknown heights in a fantasmagoric way.

In a peculiar dynamic pixels melt in a hypothetic city: the cyvers city and the informational one… A particular idea of space-time is generated by stretching the time.

Movements of evolution and degradation merge from the text in an ambiguous and apparently linear space. At the first sight, the spectator does not recognize the place or view of the city.

The first sequences that become visible concern changes that men produced in the environment. The images mutation is related to recent epidemics and environmental catastrophes that motives the scientific environment. After a while the signs and indications appear in a kind of loop, but in an extra-temporal text-space.

By technological means I create a metaphor of living processes and represent the historical changes produced in the environment.

In the hypertext open link, simultaneus direction of lecture are acceptable. If the notion of time resume specific aspects of the human experience, our perception and consciousness coordinate the relation of the elements. Cyvers events don't occur as a succession, and for this reason I introduce the concept of extra- temporality. This includes aspects of incertitude and also pluridimensionality of time. So, the basic structure of the text is under the influence of a virtual and order. The cyvers-poetry conception adds versatility and polyvalence as a result of the disembodying experience, better saying a sensible disembodying mind.

In this concept, the image - the permeable computer skin and digital flesh are part of the virtual body: a super- sensitive structure of reality.

Poetic hypnosis regardless of which medium we use, expands or amplifies the power of our brain. The creation of a poetical algorithm allows us to reach a new cyber-structure: the cyvers-perception. From the cyvers-perception we can find a new application in criss-crossing it with the concept of hypnosis. The hypnosis is a transitional mental state, in between the state of deep sleep and the state of awakeness.

Cyvers-hypnosis is a deliberate transitory mental condition comparable to a dream state. Cyvers-hypnosis is an amalgamation of virtual poetical immersion, cyvers-suggestion and organic paradigms.

Through an analogy between poetry and bio-technology, we reach the reversibility of living process. We know that cells placed in pelicular conditions reverse the aging. In the project, *Cloning Shapes* (1997-2002), the images are born of a flux created by a particular program.

The words are transformed into images, letters, viruses and pixels generated by a genetic, unpredictable and evolutive algorithm.

These are the artistic subjects which I work on, and I find its mutation between sign, image text and the significant as *Viral Icons* (1997).

That was the time that a title virus appeared using modelling scientific images of virus, DNA and enzymatic process as an art work in a laboratory at the ICGM (Cochin Institute of Molecular Genetics, France). During the residence the *Art and genetics Project* (95-99), was elaborate at the ICGM, in collaboration with the INSERM (National Institute for Health and Medical research, France) and Pasteur Institut in Paris.

The decyphering of the Human Genome should make us conscious of our nano essence: the strictly ancien inner aspects of our body that are visible throught augmented reality and with the methodological models of science. The project that determined the structure of DNA in 1953 and all the methods culminated in the sequencing of the human genome marked the life sciences as a major cultural paradigm; as the theories of Mendel did at the mid-19th century.

The inner body has been expanded with the deciphering of the genetic code and in the same way our understanding of the planetary system has been developed. We are exploring Mars by means of robotic applications and seeking for new planets.

But we are just as far from Pluto as from the whole functioning of our inner perception.

The conquest of space brings a new expectation to the accomplishment of acts and collective actions.

The group pronouncing itself in unison is also part of cyvers: the collective performance in the space within participation of remote observers in other cities or outer space bases. It is even in this way that I understand also the peer to peer network, in the construction of a new poetical and intelligent environment.

The relationship of art and science is not new.

The meeting of art and science is the result of a long social process of evolution. This it started with the human being organizing in groups to find an answer to the survival of the specie and took definitive shape under the Renaissance and the 19th century.

But today the creation of an augmented reality and as by consequence augmented metropolis and augmented consciousness should also cause to humans beings to lose part of the personality. The crisis of our times is also a result of the concentration of capital and technology.

Conclusion

The hypothetical city is raised in front of and in parallel to the real city but all this phenomena is part of a dystopia. Once again humans should create a new environment to seek answers for the survival of the specie. An interplanetary network should also merge and this is a part of a cyvers: which means that a real ideological substance is added to the poetical practise itself to create a desmystified reality. As the augmented reality evolves, contains itself the risk of bias: the goal becomes an impersonal aspect of technology concerning human beings living this particular crisis of the civilisation in a de-constructed system.

It is in this way that the neuronal network can also be compared to a cloned weaving of a merging cyber - poetical - organism in the global era. With cyber-space and cyber-electronics, we should reach the immersive environment, the synthesis of this huge totality of meaning and sensorio-perception, sensitive knowledge in a high level of abstraction and poetical substanciation (Cyvers).

In this conception the consciousness is like a permeable skin. It can be cloned and cultivated in a new extended gene-poetical way which would be the result of the development of technology. By technological means I represent the historical changes produced and creating a metaphor remake in a new cyvers-life the historical process.

Looking for an idea of totality, we can construct with a new value-added expanded cyber- poetry. The general meaning of my project is that with Cyvers: poetry and techne, we can change the world.

It is how we understand the peer to peer in the construction of a new poetical and intelligent environment that will feed up through a permeable network.

References and Notes:

Notes

- *In Latin America, is accepted that science education belongs to modernism as part of the emergence of the nations since the XIX century. The Cyvers concept is a consequence of a work in progress unifing physics and biological concepts, that was part of my early studies, poetry and research.*
- *'I. A.' it is the name of the collective and it was created to introduce a new concept concerning the intervention of technology and the role of artist related to advanced technological proceeded and ingeneering created in the early eighties by the author. Pierre Restany launched part of this production it in 1992 as he Language of energy.*

References

- *Susana Sulic, L'image dans tous ses états, (Paris: John Libbey, Institut Cochin de Génétique Moléculaire, 1997).*

- *Susana Sulic, Science et Technologie dans l'Art Contemporain en Argentina, (Paris: L'Harmattan, 2004), 154.*

NEURO-TECHNOLOGY AND AUGMENTED PERCEPTION

Amanda Tasse

Science fiction films suggest methods for contextualizing concepts and concerns surrounding new perceptual technologies. Through revisiting two films, I will highlight major themes of neurological perceptual representation and procedural translation associated with brain computer interfaces, while suggesting their relevance to contemporary trajectories in augmented perception and mixed reality.

Traditional science fiction films suggest methods for contextualizing concepts and concerns surrounding new perceptual technologies. Through revisiting two well-known science fiction films, *Brainstorm* (1983) and *Strange Days* (1995), I will highlight major themes of neurological perceptual representation and procedural translation associated with brain computer interfaces, while suggesting their relevance to contemporary trajectories in augmented perception and mixed reality.

Brain sensors are integrated into diverse contexts ranging from imaginative portrayal in films, actual use within interactive art works, and as scientific tools for investigation. Throughout each, the apparatus stimulates narratives of penetration, record, distribution, replication, simulation, and reproduction of interior perceptual experience. These narratives are not unique to brain sensors, but rather continue along a technological trajectory, including forms of perceptual instrumentation and methodology as diverse as the X-Ray and psychoanalysis.

Perception as Media

Brainstorm opens its trailer with the provocation: "Suppose it were possible to transfer from one mind to another the experience of another person, any person, any experience." This major fantasy surrounding this transfer of experience implies that the device will mediate an immersive experience that is paradoxically both immediate (1) and scientifically observed.   The device's methods reflexively call attention to the neurological perceptual process as a mediating act that can be extended and replicated.

"Immersed in media experience, conscious of mediated experience, we no longer experience any realm of human existence as unmediated, immediate, "natural". We can only imagine such an experience (now aware that imagination, too, is an "imaging," a mode of mediated representation)." (2)

The physiological act of perception is presented as a cinematic media process, accessed computationally through a scientific device, such as a brain computer interface, and distributed cinematically. Sensory information is recorded as electrical data signal, stored, transmitted, and reconfigured from one processing center to the next along a one-to-one pathway. In *Brainstorm*, the biological brain is intercepted and translated by an electro- mechanical headset prosthesis. In *Strange Days*, the brain-computer-interface, called the SQUID (superconducting quantum interference device) references, at least in name, early brain imaging technology associated with clinical MEG (Magnetoencephalography), first developed in the 1960s. (3) Unlike actual SQUIDS, the devices in the film and in David Cronenberg films, such as *Existenz* (1999), are partially composed of biological matter. Nonetheless, processes of perception are still

treated as computational electrical sensory streams, transmitted via digital or analog media distribution channels (tapes or CD's).

Within scientific contexts, imaging of electro-magnetic data from the brain is most frequently used to dissect and understand sensory and perceptual processes. However, computational neuroscientists have also been working to simulate imagery directly from collected sensory data. (4) EEG (Electroencephalography) Neurofeedback is a process whereby electrical neurological data is recorded and replayed for a user, translated into audio-visual signals, or as with LENS (Low Energy Neurofeedback System), fed back to the brain as an electrical signal. While chemical brain alternations are widely accepted psychiatric therapies, active electrical stimulation systems such as DBS (Deep Brain Stimulation), ECT (electroconvulsive therapy), and TMS (transcranial magnetic stimulation), are more controversial. Other experimental researchers have directly stimulated the brain to induce and study perceptual phenomena, such as autoscopy, the sense of an out-of-body experience. (5)

Augmented Transpersonal Experience

In the films, the source of pleasure seems to arise from the expansion of perception achieved through adaptive integration of the implant of another's perception within oneself. Instead of striving for a complete substitution of perception or full cinematic immersion in the entertainment material, the devices promise a greater pleasure of going beyond both self and other into territory which can only be facilitated through integration with the device. The novelty of perceptual difference might increase awareness of one's own interpretive biases and filters, propelling the user into a state of augmented meta-awareness beyond the confines of the individual self.

Both films use the fantasy of experiencing another's perception to engage with the desire to know what happens at the moment of death and beyond. In *Brainstorm*, this ability to see beyond the confines of one's own perception culminates in a scientific and spiritual quest to experience extended frontiers beyond mortality and physiology itself. This desire to engage in the most forbidden of experiences, seeing death before actually dying, is presented as an alluring scientific, philosophical, and entertaining goal. In *Brainstorm*, the main protagonist scientist, Michael, excitingly exclaims: "I'm scared, but the thing is, I like it. I want more. It's a chance to look scientifically at the scariest thing a person ever has to face."

Representational Modes

Brainstorm maximized the special effects of its day, including extended 70mm show-scan projection technology and enhanced graphics, to represent the transcendent experience of dying first as a poetic reflection on the brain as computer database memory mainframe, before travelling through psychedelic abstraction, and then finally dissolving into hyper-space. Douglas Trumbull directed *Brainstorm* after producing other effects sequences representing the sublime through of technology and space, including *Close Encounters of the Third Kind, 2001: A Space Odyssey, Star Trek: The Motion Picture,* and *Blade Runner*.

Strange Days presents the perception of dying as a pleasurable desire in more pathological terms. Snuff tapes, in which an individual's perception is recorded as they die, are a prized form of entertainment. During the film's homicides, victims' deaths are shown on screen, while the perceptions of the perpetra-

tor are continually recorded and simulated for the victim - homage to the voyeuristic pleasure of augmented terror presented in Michael Powell's film, *Peeping Tom* (1960). Here, desire concentrates on an intensification of physiological expression associated with fear of death and the otherwise unrepeatable embodied terror of dying, rather than transcendence or dissolution of individual material experience.

In *Strange Days*, the clips end at death, asserting that perception is either an on/off binary, or ceases to be able to present information related to its own destruction. The clips are displayed in factual photorealistic form without attempt to treat perception subjectively or abstractly, even in moments intended to represent intense feeling and death. Instead, perception is displayed as classical first person point-of-view cinema. While the dominant movement within contemporary visual effects continues towards graphical photorealism, alternate trajectories do exist, emphasizing abstracted subjectivity, exaggerated hyper-realism, and other forms of stylization serving affective perceptual effect. (6) In terms of brain computer interfaces, movements of presentation might span the gamut from desires to replicate or simulate objective reality, to alternate attempts to diminish or amplify more affective, subjective, or thematic aspects of perception for narrative aim.

In conclusion, examining notable science fiction narratives is a valuable method for extrapolating conceptual trajectories of less traceable interactive media art forms. In particular, *Brainstorm* and *Strange Days* demonstrate how perceptual processes and mediation devices have been represented, contextualized, and integrated with popular media forms, while suggesting thematic issues relevant to working with augmented perceptual devices. If perception is framed, translated, taught, modified, and augmented in part through existing neural technologies, what new speculative design contexts might be employed to encourage the development of devices that augment perception in ways beneficial to society?

References and Notes:

1. Jay David Bolter and Richard Grusin, "Remediation," *Configurations* 4.3 (1996): 311-58.
2. Vivian Sobchack, *Screening Space: The American Science Fiction Film*, (New York: The Ungar Publishing Company, 1987), 237.
3. David Cohen, Edgar A. Edelsack, and James E. Zimmerman, "Magnetocardiograms Taken Inside a Shielded Room With a Superconducting Point-Contact Magnetometer," *Applied Physics Letters* 16, no. 7 (1970): 278-280.
4. Yoichi Miyawaki, Hajime Uchida, Okito Yamashita, Masa-aki Sato, Yusuke Morito, Hiroki C. Tanabe, Norihiro Sadato, and Yukiyasu Kamitani, "Visual Image Reconstruction from Human Brain Activity using a Combination of Multiscale Local Image Decoders, " *Neuron* 60, December 11 (2008): 915-929.
5. Olaf Blanke, Theodor Landis, Laurent Spinelli, and Margitta Seeck, "Out-of-body experience and autoscopy of neurological origin," *Brain* 127 (2004): 243-258.
6. (Sobchack, 283).

SUPERDUTCH: NEW MEDIA, PHOTOGRAPHY AND THE INTERNET-POLDER

Jordan Tate

Functionally, there are a multitude of internets, or rather, internet-polders that isolate aesthetics, memes, and trends; it is these spaces, these poldernets, that allow medium-specific critique to function by temporally defining any given medium or subset of that medium. The schema I propose, or rather adapt, examines meta-photographic / meta-digital new media works through a deconstruction of the polder model.

Consider the following: all web space is reclaimed, artificially kept online through a series of routers, domain name servers, internet hubs, and server farms, all directing information and traffic to domains much like the dikes and damns route water away from a polder. [1] I submit that the creation and presentation of work on the internet-polder is a cooperative and collaborative act that surrenders all work to this shared space in order to establish a localized, specific, context. Functionally, there are a multitude of internets, or rather, internet-polders that isolate aesthetics, memes, and trends; it is these spaces, these poldernets, that allow medium-specific critique to function by temporally defining any given medium or subset of that medium.

Defining photography as a whole is an insurmountable task given the breadth, scope, and application of the medium, but through the aesthetic and conceptual isolation of similar works, we are able to provisionally define a given media, or function of the medium, through the establishment and isolation of the polder as a microcosm of the broader field.

I aim to define a structure that facilitates the consideration of medium specific inquiry in contemporary photography / new media. In this, I seek to position the internet as a crucial incubator for the foundations of the new modernist inquiry that is reflective of much contemporary art. The schema I propose, or rather adapt, examines meta-photographic / meta-digital new media works through a deconstruction of the polder model. [2] This is simultaneously a reference to their geographic-aesthetic origins and the ideas of meta-photographic / meta-digital works and process-based inquiry. This paper is couched in the framework of understanding the internet and screen based media as a method of production and comprehension as well as a means of image reproduction, dissemination, and a venue for defining a medium.

By placing this discourse in the context of the polder model, we can explore and illuminate the context of the concerns of my contemporaries while positioning the internet as a necessary collective space for these memetic, temporal, and dynamic inquiries into the form, structure, and purpose of media.

While both new media and photography can be a bit slippery to define, I propose that we use a (temporary) working definition that will help navigate some of the arguments set forth in the following paragraphs. I choose to define them in this fashion because these understandings are not, nor should they be, static. Since allowing for updates to these definitions is crucial, I will source the most current, open-source version widely available – Wikipedia. Regardless of the structural problems, issues of accuracy,

and lack of authority, the form and format of Wikipedia mirrors many of the crucial principles of the polder model.

new media (art) is a genre that encompasses artworks created with new media technologies, including digital art, computer graphics, computer animation, virtual art, Internet art, interactive art, computer robotics, and art as biotechnology. The term differentiates itself by its resulting cultural objects and social events, which can be seen in opposition to those deriving from old visual arts (i.e. traditional painting, sculpture, etc.). [3]

While new media inherently evolves and changes (as its appellation suggests), photography has a tendency to be bogged down by tradition and hold fast against any fundamental redefinition of the medium. That said, photography is historically a medium of fluidity and adaptation with regards to processes and technological development, while remaining steadfast in its dedication to the ideals of the photograph as a mechanical reproduction of reality In this paradigm, the function of photography is often as translation rather than an inquisition.

photography is the art, science, and practice of creating pictures by recording radiation on a radiation-sensitive medium, such as a photographic film, or electronic image sensors. [4]

In order to render this a functional argument, we must ignore the ever-present concern that photography is in crisis. That said, it is still important to address the medium as we have defined it so we are able to consider photography as a unified concept that we are then able to examine and critique. For this, we will adopt a modified version of the polder model.

Traditionally, polders are tracts of land that lie below sea level and are reclaimed by various hydrosculptive means for agricultural and settlement uses. Apart from the shared structure of the reclamation of land/information, one inherent necessity in the creation/maintenance of a polder is shared responsibility and consensus. In this argument, that collective mentality is a conceptual precursor to the necessary functionality of internet tropes to shape and define a framework that encourages self-reflexive inquiry.

At last we arrive at the idea of superdutch. This term, as I choose to use it, is both an homage to Bart Lootsma's *Superdutch: New Architecture in the Netherlands* (2000), [5] and an acknowledgement of the beginnings of a new modernist inquiry in contemporary art that I argue functions within the internet-polder model. The acknowledgement of Lootsma's text in this nomenclature is a derivation of his observation of modernist trends in contemporary Dutch architecture. There is an international groundswell of contemporary artists practicing in the densely populated no-man's-land between photography and new media who approach process (or work) as *the work*. These pieces revel in their simplicity and richness of memetic [6] reference by mirroring frenetic thought patterns evocative of an active message board. In order for these works to function, there must be a shared space, context, or point of reference. In this context, our shared space and the point of reference that bridges the gap between these two technology-based media is the internet. It is our hive mind, our collective understanding, our polder. It allows us to reclaim data from the ether and isolate, rather than elevate, information/images and distill stimuli into some sort of discourse that is at once separate, yet always on the precipice of falling back into the sea should we no longer agree on its purpose. It is in this action that we can establish a working definition, one that serves to illuminate our purpose rather than attempting to define the nature of the entire medium. We are reclaiming land from the sea, not attempting to define terra firma.

The function of art qua process when applied to superdutch works is to question the "aura" of the work while challenging the structure of media and allowing process to usurp product. By presenting examinations of process as the final product, these artists are engaging in a modernist critique of technological processes as medium rather than approaching the implications of the processes of medium.

Here is where we come to the ideas of McLuhan. [7] If one accepts the premise of the internet as a venue for the development, definition, and production of media, as well as the argument that an appropriate metaphor for this phenomenon is the polder model, then you must also concede that these polder-nets are temporary. It is in this temporality that we find the new purpose of the vast majority of works that fall within the scope of this argument. These works function as an inquiry rather than a statement; they examine and take inventory of the contemporary landscape and impose themselves upon it.

In allowing works to be isolated from the sea of imagery, we are not only able to foster a dialogue on the message and function of media, but we are also on a smaller level able to reclaim a shore on which to stand to consider this process. It is important, however, to consider how new ground comes to exist and why the polder model is crucial to the understanding of myriad contemporary works. The aim of these works is not to elevate any given stance, aesthetic, or augmentation of the medium, but rather, to come to understand what ground we stand on.

References and Notes:

1. *Encyclopædia Britannica, "Polder," Encyclopædia Britannica. Encyclopædia Britannica Online, 2011, (accesed June 29, 2011).*
2. *John Peet, "Model Makers," The Economist, May 2, 2002.*
3. *Wikipedia, "New Media Art," Wikipedia.org, http://en.wikipedia.org/wiki/New_media_art (accessed June 29, 2011).*
4. *Wikipedia, "Photography," Wikipedia.org, http://en.wikipedia.org/wiki/Photography (accessed June 29, 2011).*
5. *Bart Lootsma, Superdutch: New Architecture in the Netherlands (New York: Princeton Architectural Press, 2000).*
6. *Richard Dawkins, The Selfish Gene (Oxford: Oxford University Press, 1979).*
7. *Marshall McLuhan and Quentin Fiore, The Medium is the Massage: An Inventory of Effects (Berkeley, CA: Ginko Press, 2005).*

COLOUR DATA PROCESSING

Jordan Tate, Adam Tindale & Ryna Boatright

This paper discusses Colour Data Processing, a live-computing installation that explores contemporary relationships to data and colour representation through the analysis of the video signal of a customized colour rendition chart compared to its original referrant.

Colour Data Processing is a live-computing installation that explores contemporary relationships to data and colour representation through the analysis of the video signal of a customized colour rendition chart compared against the numerical values of each colour represented. The installation has three primary components: a 2m x 3m colour rendition chart, a webcam, and an exposed-circuit linux computer running a colour accuracy algorithm. The lynchpin of this project, both visually and conceptually is the colour rendition chart that situates Colour Data Processing within the realm of colour science and digital reproduction.

Our colour rendition chart is both an homage to, and a deviation from the form and intent of the original Gretag MacBeth ColorChecker1. The installation 2m x 3m colour rendition chart incorporates the 24 colour set intended to function as a broad/universal basis of representation while adding 40 carefully selected colours representative of the predicted palette of the skin-tones and wardrobes of our attendees.

Our proof-of-concept installation uses a webcam, custom-built computer, and a projector as a capture-processing-output device to implement the exploration and exposing of the colour representation. Processing2 was used to create custom software that determines the accuracy of colour by comparing RGB data to a pre-determined palette using Cartesian distance in three dimensional space. Two different representations are simultaneously processed and displayed by the system. The first feed shows a live representation of the viewers with their colours shifted to a colour palette consisting of 64 different colours. The second video feed displays a black and white representation of the amount of shifting (or error) that occurred when the colours were converted.

Colour Data Processing questions the veracity of photographic and digital reproduction, but not with the intent of challenging the context or state of photography, but rather establishing photography as a flawed method of reproduction.

Our system recontextualizes the functionality of the Gretag MacBeth ColorChecker, addressing the instance of digital reproduction and valuing data over the accuracy of reproducing the physical referent. However, our referent is collected data from a sensor rather than the colour rendition chart, removing our process from traditional calibrations by a full reproductive generation. We embrace the same deviations and error commonly found in digital reproduction to critique and analyze our current methods of digital photographic reproductions throughout the chain of custody of the digital image.

For example: if we reproduce the colour represented by the RGB values R113 G236 B27, the representation of those colours would be perceptibly different regardless of the consistency of data. The malleability of our perception is where we choose to investigate the shift from scientifically represented data to perceived data through translations from digital devices.

Our interests in the reification of this discrepancy arises from the invisibility of these processes. In a sense, these differences are never examined, as multiple versions of the same original are rarely compared to one another. Therefore, each viewer has their ownversion of the original that is an exact binary reproduction of every other original in existence, but visually and contextually each original is inherently different and unique to each individual viewer.

When a work of art exists first on screen, rather than in print (when reproduction precedes production), there is a lack of a perceptual referrant, a scientific control, if you will. Each instantiation, while an exact data replica, is merely one state of an infinite number of variations of the "original". Given that the technical reproduction of information is flawless, each presentation and viewing of the piece is still fundamentally unique, but not in a way that can be accounted for or controlled by the author of the image. Colour Data Processing examines this system through the perceptual replication of colour using a modified spectrophotographic method to calculate the numerical shift of perceptual color reproduction.

The first installation of our work was in October at TPTP Art Space in Paris, France. The space, approximately 6x6 meters, consisted of the four essential components: custom colour chart, webcam, custom computer, and projection. The space was designed so that viewers circulated directly in front of the large fields of colour while simultaneously confronting themselves in the two large digital reproductions on the opposing wall. The exposed-circuit computer and webcam (mounted to a tripod) were centrally positioned between the viewers and the projection and therefore was perceived as the nucleus of our work as well as seen an art object that encouraged introspection on the computer processes at work. The sole light source for the large colour target is the direct reflection from the projection of the new representations, providing an evenly lit space which allowed for consistent gathering of image data. Our installation is a closed loop reproductive system, where the viewers are cogs within the process itself.

The software evaluates every pixel in the image generated by comparing the pixel values for their proximity to the nearest colour in the pre-determined palette. The proximity is computed by calculating the Cartesian distance between the current pixel and every colour in the pre-determined palette. The colour in the palette with the smallest Cartesian distance from the current pixel is replaced in the modified image. Once this process is complete the colours in the modified image contain only colours in the pre-determined palette. Cartesian distance is computed as follows with r,g, and b corresponding to the red, green, and blue values of each pixel where each pixel is indicated by a subscript c indicating the current pixel and subscript p indicating the the pixel in the palette for comparison.

$d[n] = (r_c - r_p[n])^2 + (g_c - g_p[n])^2 + (b_c - b_p[n])^2$

A second image is generated by using the smallest Cartesian distance and then mapping that value to a black and white colour palette. The result is that a colour close to the palette will have a darker colour and a colour that is distant from the colour palette will be brighter. This allows the viewer to have a representation of the accuracy of the colour matching algorithm. The threshold for the representation of the error was set to produce the best visual results. It was found through exhibiting the work in Paris, that even if all lighting variables were controlled (Color temperature, light evenness, etc.) and the control colours were adjusted within the software to reflect the actual colours perceived by the camera

within the space itself, our system still displays some amount of error. This underscores that variability and imperfection is inherent in any digital reproduction system.

Beyond the accuracy of reproduction, what are the implications of this phenomenon? Most importantly, when a work of art is first presented on the internet, every viewer has an equally authentic experience with the work. If, as Benjamin suggests, "The presence of the original is the prerequisite to the concept of authenticity" each viewer is experiencing a fundamentally different original while sharing in the collective experience of visualizing the exact same data. In this context, each experience is visually different in colour, quality, physical size, and context as well as the more subjective differences of perception.

We share an interest in questioning the representational nature of photography from technological, conceptual, and theoretical perspectives and what affect the instance of reproduction has on the perception of reality, or on the original. Colour Data Processing addresses the theoretical and practical implications of digital reproduction, colour sorting, and the function of algorithms (both practically and aesthetically) in image processing, reproduction, and manipulation.

References and Notes:

1. *C. S. McCamy, H. Marcus, and J. G. Davidson, "A Color Rendition Chart" inJournal of Applied Photographic Engineering 2, no. 3 (1976): 95-99.*
2. *Processing official Web Site, http://www.processing.org (accessed June 1, 2012).*

URBAN ECOLOGIES: DESIGNING FOR DYSTOPIA

Joni Taylor

This paper will address how the Australian landscape continually forces its way back into the built environment. It will attempt to examine how a new urban ecology can be nurtured by curating, one that does not define separate spaces for nature or architecture. In the blurry haze of utopia and dystopia, should the crisis not be averted, but adapted for a new futurology?

Dust Storm, Sydney, 2009. Photo credit: Joni Taylor.

1.

On a morning in 2009, Sydney awoke to a city enveloped in an eerie red light, the dust and sand of the desert had blown its way eastwards and was stopped only by its collision with the Pacific Ocean. The sensation of the familiar cityscape stained red in an impenetrable haze was unnerving. The Queensland floods early this year saw the Central Business District of Brisbane evacuated and the power cut, a Ballardian image of an abandoned metropolis slowly flooding filled our television screens.

The Australian landscape is continually forcing its way into our urban areas, and includes annual bush fires and flash river flooding.

But are these true crises or has nature merely manifested itself somewhere a bit too close to our hearths? Are these "natural disasters' only disasters because the cities we live in are at risk? Do buildings or perhaps particular architectures lend themselves to these crises?

My research begins by taking a wild and speculative look at possible future urban design, a design that incorporates the wild back into the built environment to form one dynamic Urban Ecology. This includes not just the climatic extremities at odds with our architecture, but the wild life already present in our cities. The nature that is not tamed and cultivated, but dirty and abject, that comes up through the cracks and spreads between the paving stones. It is disorderly, unfinished and dynamic. In this new Urban Ecology, the city and the unruly forces of nature would not be in conflict but work together.

Urban design has traditionally pushed nature away, the garden cities of suburbia and post war modernist ideals domesticating the extreme environment. More recently, it is an artificial nature manipulated by new technologies for our own benefits. These new ideal visions that promise clean, green, carbon neutral cities are simply another Utopian non-place, that have no connection to site or scale. This exclusion is reminiscent of former failed and unbuilt utopias ala La Corbusier's *Plan Voisin* for Paris – where nature is ordered and programmed as are all his Towers in the Park.

And unlike the natural landscape, which is adaptable and regenerates after extreme weather and rising waters, much current urban design and infrastructure is unadaptable and inflexible and without the capacity to be disrupted, disturbed or transformed.

The urge to build new utopias should be resisted. Instead Urbanism needs to allow the wild and the untamed back into its plan.

It is here that it is useful to look to the dark twin of utopia - Dystopia. If Dystopia is the chaotic, the unplanned and the uncontrolled, it is therefore vital to incorporate these attributes into the urban plan, or as utopian architect Cedric Price would call the "non-plan." [1] Instead of the top down planned utopia, cities must be designed with dystopia in mind - the chaos, the flood, the crisis. Instead of ideal and grand Master plans, future urban design needs to embrace time, contingency, dirt and above all the greater nature that not just surrounds it, but shares our spaces.

In order for a city to be truly sustainable, architecture needs to be open and adaptable to the chaos and surprises that the natural and unruly elements continue to throw at it.

In the blurry haze of utopia and dystopia, should the crisis not be averted, but adapted?

"When rust sets in on a razor blade, when moss grows in a corner of a room…..we should be glad because…life is moving into the house." Hundertwasser [2]

The writer Davis Gissen describes a whole new ecosystem of *subnature*, [3] where architecture instead of resisting the forces of weather and climate, actually embraces it into the design process. His definition also goes so far as to include pollution, exhaust fumes and smoke, as well as mud, insects and weeds.

2.

By incorporating nature into the urban fabric itself, cities are open to transformation and adaptation.

My work looks at how this can be achieved.

As a curator, I aim to present speculation and dreams, and experiment with urban spaces as places for growth and change. These experiments in the urban landscape, whether by artistic interventions or temporary design, can highlight and suggest new ways of designing spaces. Unlike rigorous urban planning these activities are safe-to-fail, and examine the city as a space that can take shape and grow.

One such example in response to this was the curated, public project entitled *Urban Wildlife Safari*, where participants traversed the city, exploring local spaces within the Sydney Central Business district and the flora and fauna that inhabit it. "It offers a unique glimpse into how the urban landscape acts as a backdrop for human/nature interaction and how this is changing. The project aims to resituate the city as one element of a living organism giving refuge and sanctuary to many forms of wildlife." [4] Ultimately it involved examining the city and its wildlife as one eco-system. Experts from different fields were invited to examine these often overlooked spaces and opportunities that the city offered. The artist Diego Bonetto studied the non-native or invasive species (weeds) that thrive in the abandoned parking lots and the *terrain vague* of harbourfront wharehouses. Here the residual areas or *dross-capes* act as fertile ground for new ecologies to develop uninterrupted. An ornithologist pointed out how birdlife uses architecture and the local terrain as a hunting ground. And the waste at the popular tourist spot of Circular Quay too provides ample food for ibis and seagulls in opposition to their native diet.

Another recent curatorial project *DIY Urbanism* [5] went deeper to specifically examine Sydney and its urban condition, and uncovered ideas for self initiated urban programming. The projects relied heavily on Sydney's unique environment and suggested bottom up approaches to the city's future design. Projects included fantastical recreations of a new harbour island to deal with polluted rainwater runoff (*waterways* by Josephine Starrs and Leon Cmielewski) and the adaptive reuse of McMansions to create sustainable housing (*Reincarnated McMansion* by Mathieu Gallois). Sydney's large inner city flying fox population is another contentious addition to our local ecosystem, on the one hand helping to pollinate the city's flora and on the other feasting on suburban gardens and destroying heritage trees. The project *Botanic Gardens Xtension* by Remnant Emergency Artlab speculated on relocating the bats from their current habitat in the Royal Botanic Gardens to a new controversial development site at Barangaroo, creating a native wetland there for them to roost.

In conclusion, future city design need not just develop new technologies that alienate nature further. The push towards carbon neutral skyscrapers and eco-friendly new towns often fails to cultivate the urban ecologies that are already present. The new urban ecology must incorporate the wild ecosystem into its own workings, where architecture and nature work as one dynamic system that embraces the ebbs and flows and impermanent spaces that Dystopia brings. By curating - one can act as an iterant urban planner - using the city as a testing ground for new prototypes.

References and Notes:

1. Cedric Price, Reyner Banham and Paul Barker, "Non-plan: An Experiment in Freedom," *New Society*, March 20, 1969.
2. Friedensreich Hundertwasser, *Hundertwasser Architecture: For a More Human Architecture in Harmony with Nature* (Koln: Taschen, 1997), 48.
3. David Gissen, *Subnature: Architecture's Other Environments* (New York: Princeton Architectural Press, 2009).
4. Accompanying brochure from "Urban Wildlife Safari" by Joni Taylor and Norbert Walczak for the exhibition titled as "In the Balance: Art for a Changing World" in Museum of Contemporary Art, Sydney, 2010.
5. Curated by Joni Taylor for the exhibition titled as "The Right to the City," in The Tin Sheds Gallery, Sydney, 2011.

INTELLIGENT CONTENT AND SEMANTICS ALGORITHMS: THE NEXT DIGITAL ARTISTS?

Luis Teixeira

Information Technology continues to foster the confluence of multimedia, web technologies, and knowledge representation and reasoning. The goal is to promote original approaches and techniques for empowering creative usages and enabling interactive experiences based on an understanding of the content itself. This paper presents an overview of the of the projects on-going.

1.   Introduction

New media has emerged as a distinct category in Art in the late twentieth and early twenty-first century. New media art practice is being refer as a new avant-garde, an art practice of the future, ahead of its time and, as yet, not fully capable of being recognized or accepted. Thus its role would be of pushing the boundaries of the medium of art itself.

In 2003, Christiane Paul proposed two classes of digital art, one that uses digital technologies as a tool for creating traditional art objects, and a second class that uses digital technology as the medium itself (works are stored and displayed exclusively in the a digital environment).

Cooperation between artists and scientists have been promoted as a way to grant access by artists to computational systems that are found in industrial research laboratories and university centers, where scientists carried out their work.

This cooperation has been intense due to the know-how that scientists hold in these areas. Nevertheless there is a lack of knowledge about the most recent advances that are radically transforming the artistic field, while IT experts often have little or no background in the humanities or the arts fields.

2.   Intelligent storage and retrieval

The availability of digital media content such as video, audio, images and metadata (data that describes the content) increases the possibilities to create and share media. To efficiently support these new application techniques such as intelligent storage and retrieval have been further developed. To design these systems several issues are usually considered such as storing and preserving the content and metadata, search for the proper content, distributing content to local devices, guaranteeing property rights and content, and global system management.

The volume of digital media that has been produced and stored, and the exponential rate that keeps being produced and stored, has by now become uncontrollable without the support of computational systems. Low-level approaches, to describe digital content, based on signal analysis, have demonstrated to be particularly restrictive in allowing media database systems to be accessible and useful to computer

user. Also low-level descriptors based on content are distant from what users use as a means to recognize media description. Therefore, research has begun to center on semantics and fill the gap that subsists between the conceptual and the end-user regarding the content based on high-level descriptions.

One solution to overcome this gap is knowledge-based techniques based on Web ontologies. As formal and web-wide shared conceptualizations, ontologies facilitate the automated integration and meaningful retrieval of multimedia –both content and metadata– from different sources.

One limitation is that metadata is still limited and expensive to produce. MPEG-7 standard (Multimedia Content Description Interface), constitutes the greatest effort for multimedia description. MPEG-7 goal is to create a standard for the description of the multimedia content that supports some degree of interpretation of the information's meaning. Although MPEG-7 constitutes a valuable starting point for more specific developments, it lacks of explicit semantics that make MPEG-7 very difficult to extend in an independent way.

3.   **Framework for Artistic Production**

Ontologies are vital in order to enable the sharing of knowledge and reuse in various fields. Good domain ontology must retain all the crucial elements that conceptualize a domain, and the domain expert should be easily able to cross-examine the ontology.

An example of this tool in art is the ANSWER (Artistic-Notation-based Software Engineering for Film, Animation and Computer Games) ontology that model the semantics necessary "to interpret the process of film production consistently for all users (directors, producers, DOP's (Director of Photography), grips, post-production, lighting, etc)".

The ANSWER project has a dual goal: producing an artistic language for the recording of film-directing design and developing a semantic model of the film directing domain. The notation should allow the artist to record their ideas and also to formalize their own creative thought-process (designing the artistic notation will allow to serve as a guide in order to design an effective semantic model). A major part of the knowledge is the "tactic knowledge", that is, the artist inner skills that he uses when analyzing the ideas he has expressed in notation.

Although this is production knowledge, not film content knowledge, it still gives access to the technical awareness of how the process of filming takes place. Thus one may translate the notation, the description of content-design into the "tacit knowledge" level of understanding. Additionally, it is also necessary to formalize the semantics of the artistic notation itself with the risk incorrect expression due to ambiguities. This quest of orient research to automatically compute traditional artistic notations, such as music or dance, also has resulted in very difficult problems as notation allows subjective interpretation of its meaning. In the end, the entire model is based on this knowledge to explicitly model the artist's "tacit knowledge".

iMP (intelligent Metadata-driven Processing and distribution of audiovisual) aims to enable a 'Virtual Film Factory' in which creative professionals can work together to create and customise programmes from large digital repositories, using semantic technologies to organise data and drive its processing. The creative aim of the virtual film factory is to assist and encourage the interactive creation of itera-

tions and versions which enable a superior creative outcome. For the purpose of this research iMP project created Movie Post-processing Ontology (MPO), which is a set of modular ontologies providing a list of hundreds of relationships and concepts related to movie post-processing.

European project, FOCUS K3D, aims to exchange and disseminate novel ideas and techniques in the emerging research field of semantic 3D media. One of the application fields is Gaming and Simulation where frequently not only single objects have to be modeled, but as well whole virtual worlds including mutual relations between objects and this virtual world as well as among 3D characters. Nevertheless, knowledge technologies impact is rather limited. Only recently semantic issues like ontology development have been incorporated (for example, the AIM@SHAPE Ontology and Metadata Repository, MagnetarXSG or CORG- Collaboration Ontology Roles Game). Projects such as I3DPOST (intelligent 3D content extraction and manipulation for film and games) have started to research ways to integrate 3D information extracted from the visual scene into all stages of the postproduction pipeline, supported by semantic metadata, by the development of methods for recovering intelligent, structured content from on-set filming, and incorporating them in capture environments and software tools to enable the simple manipulation and reuse within post-production and the retargeting of content to interactive platforms. The impact of these efforts can be rather important if these efforts converge to a unify game ontology development effort occurs, and common procedures for managing 3D content for efficient re-use.

4. Remarks

Recent technology advances and future scenarios that promises new tools and frameworks so that the role of an artist using digital technology as a tool for creating traditional art objects or as the medium itself will change. If the digital artist role maybe more passive in the first case (supporting the development of new tools that incorporates its process) there is an open new field in the case of the second scenario for the artist to explore, specifically the semantic gap issue (the difference between two descriptions of an object by different linguistic representations, for instance languages or symbols). Semantic gap expresses the difference between ambiguous formulation of contextual knowledge in a language and their sound, reproducible, and the computational representation in a formal language.

References and Notes:

B.S. Manjunath, P. Salembier, T. Sikora, editors, "Introduction to MPEG-7: Multimedia Content Description Interface". Wiley, 2002. ISBN: 0-471-48678-7.

Chakravarthy et al., "ANSWER: A Semantic Approach to Film Direction", In the paper proceedings of the fourth International Conference on Internet and Web Applications and Services (ICIW 2009), Venice, Italy

J.O. Kephart and D.M. Chess, "The Vision of Autonomic Computing," Computer, vol. 36, no. 1, 2003, pp. 41–50.

Mark B. N. Hansen, "New Philosophy for New Media", MIT Press, 2004

Paul, C. "Digital Art", London: Thames & Hudson, 2003.

Rush, M. , "New Media in Late 20th-century Art", London: Thames & Hudson, 1999

RECONSIDERING MEDIA ART DYNAMICS

Nell Tenhaaf

Push/Pull is an interactive artwork for exhibition, but also an object of study. The paper considers the social dynamics specific to the reception of such a research-based artwork, including its gaming dynamics. The collaborators on the project are interested in the role of user experience interviews in the development of such works, and in general how making artwork in a research context might best be reflected in its presentation.
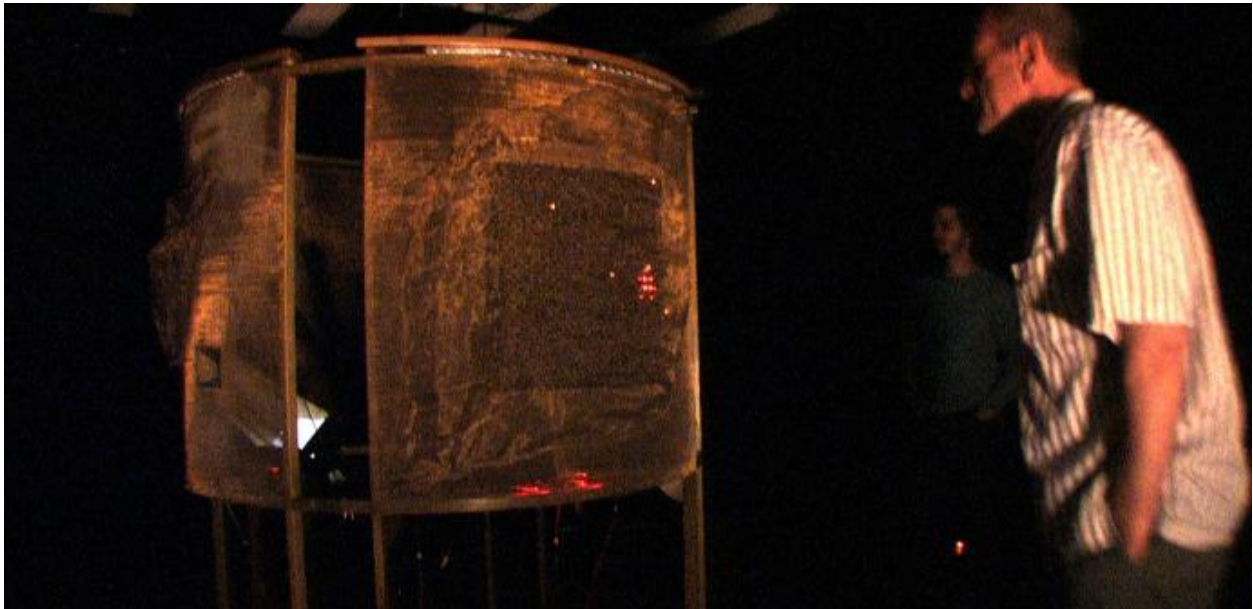
Fig 1. Push/Pull, 2009, Nell Tenhaaf – with Java programming by Melanie Baljko, 4-channel sound by John Kamevaar, custom LED boards and electronics by Nick Stedman; wood, wire mesh, LCD screens; sculpture 5 ft. diameter, 18 x 18 ft. overall dimension. Photo: still from video by Zev Farber.
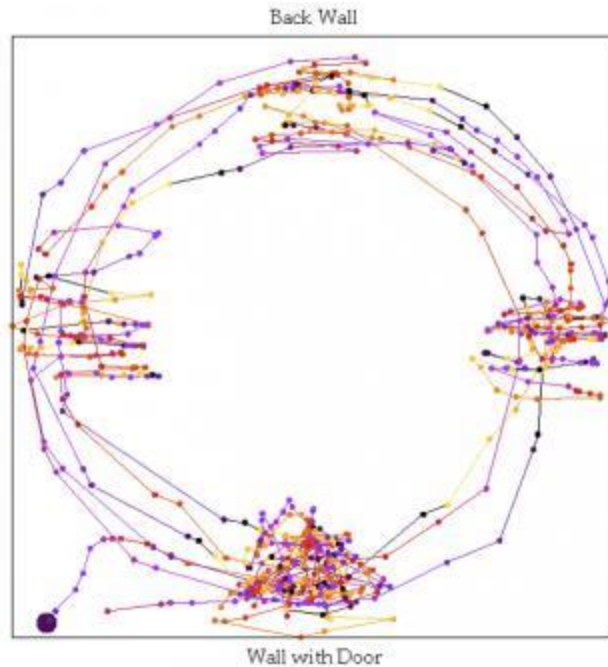
Fig 2. Tracing of interaction with Push/Pull. See Note 6 for information. This "baseline" tracing shows Tenhaaf interacting with the work. Direction and rate of movement are recorded, resulting in a portrait of time spent at a particular place.
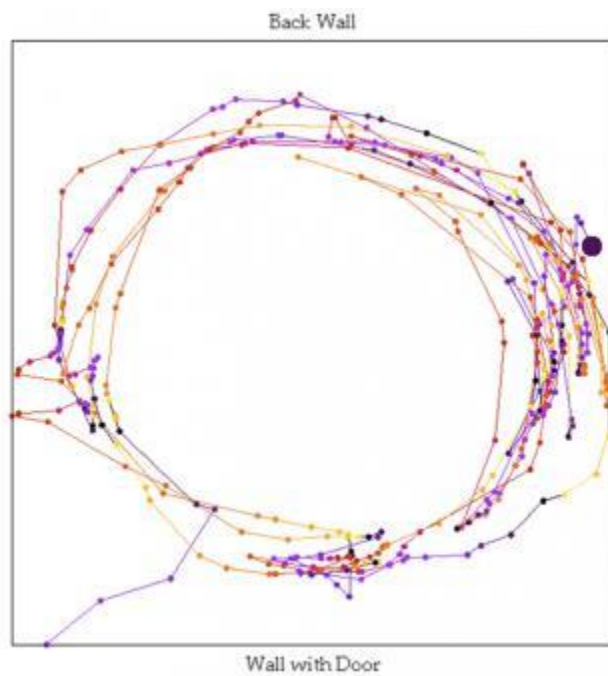
Fig 3. Tracing of interaction with Push/Pull. See Note 6 for information. This tracing shows a visitor interacting with the work. "Wall with door" is the location of the most game-like interaction.

Push/Pull is an interactive artwork conceived and executed between 2005 and 2009, with Melanie Baljko, John Kamevaar and a team of people in the context of a collaborative research project under the rubric "Lo-fi". Kim Sawchuk has also collaborated in the project in designing user experience protocols and carrying out interviews with us on a number of occasions. [1] *Push/Pull* is an artwork for exhibition, but also an object of study through which we examine some of the social dynamics specific to the reception of research-based artworks. In particular, we are interested in the role of user experience interviews in the development of such works, and also how the multi-step progression of making artwork in a research context might best be reflected in its mode of presentation. *Push/Pull* was built through a process that included several user-tested prototypes, and what we learned at each stage was incorporated into the work. The prototypes were interactive scenarios staged predominantly at the Ontario Science Centre in Toronto. They were very task-oriented in comparison to the final artwork, but the movement dynamic of the interaction carried over to *Push/Pull*: physically moving around the circular sculpture, as well as back and forth in front of its four panels, is required to activate the visual and aural expressions of the work. At the panel that is most like a game, the interactant has to virtually dance around to stay connected with her or his moving cluster of LEDs.

The strengths of the Lo-fi collaborators have shaped *Push/Pull*. Because of the modeling and computational processes that subtend biotechnology research, the topic of my art practice in the 1980s, by the mid-1990s the focus of the work shifted toward artificial life. The resulting body of work concentrates on artificial agency, and is largely interactive, both features of *Push/Pull*. Melanie Baljko's principal focus of research is computational models of conversation, a sub-specialty within computational linguistics. Modes and strategies of human conversation are used as the model for the complex interactivity of *Push/Pull*. The Lo-fi project also includes the expertise of communications scholar Kim Sawchuk, specifically, her work on audience response to new media art. Dr. Sawchuk's work traverses the humanities, social science and the arts community. Dr. Baljko and Dr. Sawchuk have developed multi-methodological evaluation that merges qualitative and quantitative approaches. John Kamevaar brings to Lo-fi a noise aesthetic and a history of live performance, through the experimental sound group Kaiser Nietzsche that he formed in the mid-80s, and many years of performing with the Toronto-based improvisation ensemble CCMC.

Social Intelligence and Gaming in *Push/Pull*

Push/Pull is programmed in such a way that layers of artificial agencies are presented to participants – from the agency of the system itself to abstract entities composed of a few lights and electroacoustic sounds. In effect, *Push/Pull* invokes a heterogeneous population of low-fidelity agents: human-representative agents are differentiated from artificial agents by colour in the LED displays and by sound, or their "voice" (the sounds are taken from the natural and media world, but micro-sampled and extensively processed).

Representation of artificial agents in interactive artwork invokes the topic of artificial social intelligence – the study of social relations that include artificial entities. Social intelligence in general means the capacity to understand experience in direct relation to how others understand it. Thus, for example, empathy plays an important role because it is the imagining of another's experience. Empathy has had a strong presence in modeling social intelligence in artificial media; it is considered by many robotics researchers to be a core feature of modeling both life-like emotional response and embodied learning, and thus essential in making more "realistic" robots. But characteristics of artificial social agents are not meant to appear simply to mimic humans or other animals. Rather, these agents when they interact

with humans in a mixed social world have to develop their own unique kinds of "mental images" of the human participants they interact with: sensor data enables the agents, whether robotic or software-based, to recognize humans and locate them within a set of co-relations. Lo-fi proposes that such a heterogeneous system of agents calls on biomimicry, because it plays out as a conversational exchange, but with the virtual agents themselves as far away as possible from mimicking humans.

The intention in our modeling of social intelligence is to shed light on issues such as the threshold of representation required to assign agency and to invoke artificial sociality. Because the interactant appears in *Push/Pull* as an agent in the same form as the artificial agents, all of the agents have an elemental subjectivity that is attributed by the human interactant, and the interactant-representative agent is a rudimentary avatar. Gaming theory is very a propos to the dynamic in the work, because modes of intersubjectivity in game play necessarily take into account the avatar as social agent. Since video games are built on the premise of a first-person player (in combat games, the FPS or first person shooter) the avatar is the quintessential artificial other, in that it represents the self as other and psychically embeds the player within the game action. This is also the entry point to sociality in *Push/Pull*. Unlike high-definition reality video games, the game-like aspect of *Push/Pull* doesn't give a more literal presence for the interactant in the work, but it does evoke similar subjective and intersubjective dynamics in the imaginary of the interactant.

In fact the agents in *Push/Pull* align closely with very early minimalist gaming representations – think *Pac-Man* or *Tetris* from the 1980s. This kind of abstraction within the gaming paradigm is especially pertinent to exploring questions of how people can be induced to enter intersubjectivity with artificial agents in the first place. Mark J.P. Wolf postulates that, although marketing values that relate gaming to familiar media such as television and film are major factors in the push toward ever more realistic game characters, in essence an abstract representational mode in gaming is historically too hard to teach people, who want intuitive understanding of game rules. [2] A parallel problem applies to the abstract game as a feature in an artwork. But it is appealing to revive abstraction, as *Push/Pull* does, for its potential to self-reflexively focus interactants' attention on their enactment of the work they are with, not on external narrative or discursive elements. The trade-off of provoking a perplexed response might be well worth it because of the immersion factor, shifting the response of feeling lost in the sense of cognitive confusion to getting lost in the sense of losing oneself in an experience. Although it would be possible to demo the mode of interaction at the most game-like panel of *Push/Pull*, for example through video shown in the exhibition space, that would foreground gaming as the core topic of the work, whereas the overall abstraction of light and sound interaction in *Push/Pull* is not secondary to the exchange with artificial agents.

Given the instantaneous call-response paradigm that dominates interactivity, it is useful to remember that one hallmark of an interesting artwork is that many more things are going on than are evident on the surface. Ever in reserve for plumbing these depths of the imaginary realm is psychoanalysis, rather sidelined in the culture world since its heyday in the 1980s but always satisfying for its ability to describe inner life. Subjectivity located in the interplay between one's self and one's otherness to oneself, and the allure of (mis)recognizing oneself in an image or representation, are game features that invoke a psychoanalytic reading. Focused on Lacan's mirror stage and on Freud's pleasure principle it could go thus:

… players pleasurably experiment with the surprising, often counterintuitive articulation between their manipulation of the interface and the avatar's obedient response. If anything, such pleasures seem am-

plified by the uncanny difference between reality and reflection: an alterity enabling players both to embrace the avatar as an ideal and to reject it as an inferior other. ... The avatar is not simply a means of access to desired outcomes, but an end in itself – a desired and resented lost object, existing in endless cycles of renunciation and reclamation. [3]

In the game, whatever the avatar (simple avatars are contained within all subsequent ones), the ego struggling ceaselessly to reconcile itself with the ideal and the abject can dominate the avatar as problematic other simply by controlling it. And the loss of this identification allows, in Lacanian terms, a momentary loss of ego, since ego is formed through - and as - identification with an externalized image of oneself. What feminist film theorist Kaja Silverman has described as "radical self-loss" can be experienced as pleasure in a gaming format, playing out the Freudian acquisition/loss repetition in a mode of sheer fun. [4]

Such repetition is certainly a dominant feature of *Push/Pull*. We imagined that the part of *Push/Pull*'s interaction overtly based on gaming would be most accessible to viewers, but the opposite turned out to be true: according to our observations of interactants' unwillingness both to pursue the game action or to say much about it afterwards, they are reluctant to shift from perceiving light and sound as a play of abstraction to perceiving autonomous agents that are composed from the same elements. Complicating the gaming interaction is the fact that the artwork as a whole system seems to be an autonomous entity that knows its environment, even though this is not strongly modeled but operates as a secondary effect. While in gaming the interactant's avatar has in a sense become the interface and the player has an assurance that it remains even when it goes off screen, in *Push/Pull* it is very evanescent, with multiple instantiations and also there and then gone. It is a problematized, misbehaving avatar.

Or maybe we are misreading what we have perceived as the interactant's unwillingness to game play. Maybe it is just that the experience is very interior and personal, a play of power and desire that acts out in the order of the imaginary, difficult for the interactant to access or articulate even when they do become very immersed in it.

Social Understanding and Commonality of Experience

Some key aspects of reception of interactive artworks are not in smooth synch with the modalities of artworld exhibition. For example, how the interaction works should be very overt and transparent so that most people succeed at it, and in a short span of time. In some ways this is a frustrating syndrome (although clearly many artists resolve the dilemma very well). In research-based work there can be additional layers of intention and meaning that the artist would prefer to reveal to interactants, and extra-discursive modes of presentation like demos, drawings, texts, or live guides are all possible strategies. Some interactive artists perform their works to get around this limitation and tease out the layers of meaning in a work for an audience, whether one by one or in groups. There may be a threshold at which a work needs to be performed by a non-novice interactant for an audience, so as to be fully revealed – we have been experimenting with *Push/Pull* in this mode.

Moreover, an aesthetics of interactivity that can be communicated to the public at large needs to be developed, so as to foster a learning curve about several issues: the role of systems themselves in such works; the interplay of task and reward with more ineffable, qualitative features; and the relationship of interactants to passive observers. Interactivity requires an aware or awake user: the interactive work always speaks to the interactant in some way and launches an identificatory process that some would

argue is even stronger than that of cinema. It is at the very least different from cinema – a new paradigm that is not well theorized or understood. The HCI (Human Computer Interaction) community has been making some inroads in this respect. [5] Artificial life art brings in questions about imputing intelligence and goals to computer systems, as well as an investigation into the mechanisms of assigning agency to non-living entities.

A direct parallel is obvious between social understanding and aesthetics: the deliciously impossible task of aesthetics is to describe experience in a language that can be common to as broad a group of people as possible, and the project of social understanding is to achieve among a group of people a shared interpretation, response, or even an agreement to disagree. Traditionally, the emphasis has been on the construction of the art object using conventionally held aesthetic principles that can assure a common ground for interpretation. This process already involves intensive feedback loops, because the reading of artworks by experts has over centuries constantly pushed the rules of how they are to be made and understood. A further loop with great potential for media art is the incorporation of knowledge about interactivity experience gathered from interactants, into a common social understanding of such experiences. The development of aesthetics for interactive media art absolutely requires user experience to be absorbed into both development and documentation of the work. [6]

The founding concept of the Lo-fi project was to take attention away from mimicry of human features and divert it to a different representational tension: that between uniqueness of experience (what is internal to the viewer or interactant, solitary) and commonality of experience. We propose that in *Push/Pull*, commonality is triggered by the sculpture's recognition of the interactant, as noted above. This is enhanced by the interaction eliciting for the interactant the belief that the sculpture's behaviours work in tandem with his or her own behaviour. That is, the participatory mode created in the interaction is such that the sculpture and the interactant clearly have unique but interdependent roles. These common understandings are complementary to the individualized process of interaction for each person. Our user interviews have shown that this balance of forces is clear to some interactants and not to others – the key interference in understanding the dynamic is the urge for more feedback, and precise feedback. Letting oneself go with the flow it is not the familiar mode for interactive art. We are interested in how an abstract, non-goal-oriented mode can inform public interpretation through art discourse, and loop back into artistic production. We caution that discourse doesn't (and should never) override experience in our staging of the dynamics of social intelligence; an interactant's personal, private experience with nothing more added is enough. There is no easy recipe for aesthetics: artists will continue to construct what they perceive to be the best qualities in an experience, and aim for awareness and understanding in the recipient of those qualities.

As an aspect of this aesthetics project, we are interested in contributing to guidelines for artists to develop user experience documentation. Preservation of new media artworks, media art histories and archives, and public understanding of these works are all bound up together in the concept of "user experience" and "usability studies" – for example in the work of The Variable Media Network and the Capturing Unstable Media project. There is space made in these structures for experiential documentation gathered by the media artist her or himself, but not yet methods for the artist to address how it can feed back into productions.

References and Notes:

1. *Dr. Baljko (York University, Toronto) and Dr. Sawchuk (Concordia University, Montreal) contributed to the development of this paper. See www.lo-fi.ca for information on the team and on "Lo-fi embodiment," which Dr. Baljko and I developed to explore the threshold of agency attribution.*
2. *Mark J.P. Wolf, "Abstraction in the Video Game" in The Video Game Theory Reader, eds. M.J.P. Wolf and B. Perron (New York-London: Routledge, 2003), 47-65.*
3. *Bob Rehak, "Playing at Being: Psychoanalysis and the Avatar" in The Video Game Theory Reader, eds. M.J.P. Wolf and B. Perron (New York-London: Routledge, 2003), 107.*
4. *Ibid., 110.*
5. *See ACM TOCHI – Special Double Issue on the Aesthetics of Interaction 15, no. 3 (2008), which includes Baljko and Tenhaaf, "The Aesthetics of Emergence: Co-constructed Interactions."*
6. *Baljko, Sawchuk and Tenhaaf shot video and interviewed about a dozen interactants in December 2010 during thelivingeffect exhibition curated by Caroline Langill at the Ottawa Art Gallery (Canada). Baljko translated interactants' movement in the videos into graphic images, two of which are reproduced here.*

FUTURE GUIDES FOR CITIES

Michelle Teran

Participation on social networks through location-aware devices has created an intriguing relation between online information and physical location. However, does this potential invade our homes or create the possibility of a more playful, chance encounter? My presentation investigates this question by probing city maps created through online videos people produce and upload.

Above the earth, I am scanning. I travel a landscape of images, formed by the occupiers of the city of E– Maps created by amateurs. I have a bird's eye view of a neighbourhood and search for moments of video wedged into the terrain, video fragments that tell me where to go. Weightlessness leads to orientation. I'm looking for something, I am looking for someone to meet.

I start this essay with a personal experience, observing a private moment now made public. Starting with a personal experience, this text examines private narratives in public spaces and the relation of information to city. The text and my experience explore the spatial and social constructions of the relationship between private and public, the notion of stranger and strangeness, and how social and spatial homogeneity are constructed and mediated by the potential social impacts of disclosing information online. The critical locus of this project emerges from my role as an artist working with media and performance over the last decade, creating site-specific performance and urban interventions that explore the relations which occur during the self-production of media and city.

I sit in front of a computer screen and observe the physical construction of a house. From an apartment in Berlin, I watch a collection of 24 YouTube videos of an event that takes place in a different city, in another part of the country. A woman and a man, Antje and Carsten, begin to build a life together. The creation of a home, and what eventually takes place inside it, is dutifully recorded on camera and put online for a global audience. The videos are superimposed on a satellite image of the city, which is how I have found the videos and now watch them. Over the course of a year, a house emerges from a vacant lot on the edge of the city, and is eventually painted and then furnished. Parties take place there. Friends are invited inside. I observe the social construction of a home. I am in the home, and they invite me inside by making and posting these videos. It is a publication of privacy, a state of being private in a public, digital space. As I watch the house go up, I wonder where the house is and what it would be like to live there. I wonder how it would feel to be invited into this space, what it would be like to meet them.

I am now in the house.

video title: House of C & A is rapidly going forward. Work is being done on the heating, plumbing, walls and electricity[1]

He walks, breathless. The walls are up but still lack drywall and paint. The floors are wet from the rain; there is no glass in the windows. She is alone, all of the men have gone. She takes over the camera, records abstract forms and cavities that will soon be a home. A stairway goes to the next floor. We are

now on the first floor in the children's room, next to the hallway, near the stairs that lead up to the attic. Below is the ground floor. Next we come to the bedroom. From the long hallway we end up in the bathroom. There's the toilet. A moment later we are in small guest room, still without a floor.

The exponential surge in the production of online video and their migration from private to public archives began in the very recent past. The availability of affordable cameras, bandwidth, production and distribution technologies have made it relatively simple to create, publish and distribute moving images online–generating an immense and ever-increasing collection of personal narratives, self-representative acts and both conscious and unconscious performances that emerge through the self-production of media and are available to anybody with an Internet connection. Depictions of birthday celebrations, fondue parties, the construction of new homes, barbecues and birthdays, feeding babies and holidays, performances, speeches and other testimonials take place in the private home, and yet can and do now have a global audience–of strangers. The willingness of people to publicly broadcast themselves suggests different social phenomena. On one hand it creates an inquiry into the kinds documented actions that emerge through self-produced media. On the other, it points to the shifting boundaries between the public and private realms, creating a tension between the public archive and private experience, between the 'boundaryless home' and outside world.

The tension between the private and the public is made even more evident through the contemporary practice of geotagging information. Videos found on the information space of the web, and associated with a URL, are now finding themselves in the real world as well. This happens through the process called geotagging, or attaching spatial coordinates to pieces of data, such as a video clips and photographs. Geo-tags can be used to explore a city, in much the same way that search engines are used to explore the virtual, digitized space of the Web. Spatial coordinates can be added to data deliberately by the user; however, many times people do not even realize that location information is added to their files. For example, current generation Apple 3G iPhones automatically embed highly detailed geo-coordinates whenever an image or video is taken with the camera. Concurrently, Public APIs–Application Protocol Interfaces–provided by YouTube, Twitter and Flickr, make it relatively easy to call up, compile and categorize publicly available data that is generated by these software platforms.

Several articles and research projects by concerned computer security experts and hackers have addressed the potential dangers of–deliberately or inadvertently–adding location information to data. Please Rob Me[2] I Can Stalk U[3] and Creepy[4] are examples of software projects that illustrate how easy it is to collect location-specific digital data and display it on a map–providing useful information, such as a person's daily routine, for the would-be stalker or home robber. In "Cybercasing the Joint: On the Privacy Implications of Geo-Tagging",[5] Gerald Friedland and Robin Summer try to raise critical awareness of emerging privacy threats that they term 'cybercasing' in which geotagged information can be used to lead to real-world invasions, stalking events, or attacks. In one cybercasing scenario, they attempt to identify the home addresses of people away on vacation. Working with a script they wrote using a YouTube API, they used a keyword 'kids' to locate home videos that people publish of their children. Using a sampling site of downtown Berkeley, CA and a radius of 60 miles (approximately 96 km), they were able to find 1000 videos of children–the maximum number allowed by YouTube. Expanding the vacation range to 1000 miles (approximately 1600km) they increased the initial amount to 50,000 videos. By comparing the two data sets and identifying only those videos made by corresponding users, they were able to find 106 videos that showed people who were away on vacation. From the 106, 12 videos looked like suitable candidates for 'cybercasing' and potential home robbery. One video was uploaded by a man vacationing in the Caribbean, who had posted several videos from a beach within a period of several days. When not vacationing on the beach, he lived with his children in Albany, CA.[6]

The scene of a home invasion that Friedland and Summer describe plays out a recurring image where a contested space which is emblematic of the tension between the private and public is made evident. A stranger comes to someone´s home with nothing but bad intentions. The public, as something external and unknown, is thus, or at least potentially, a malevolent entity and threat to the private domain. Anthony Vidler refers to this as an uncanny moment, where the home which "pretends to afford the utmost security, opens itself up to a secret intrusion of terror". [7] To understand this fear, it is perhaps useful to first provide a historical analysis of where this fear comes from. For this we must return to the 19th century. Scenes of home invasion make their first appearances within the uncanny stories of E.T.A. Hoffmann.[8] In a recurring theme a secure, intimate domestic environment is invaded by a foreign and threatening presence, rendering a familiar setting now unfamiliar and strange. Hoffmann's stories, written in the late 19th century, mirror the socio-economic traumas experienced during the rise of Industrial Capitalism and subsequent emergence of modern cities, which occurred in throughout the 18th and 19th century. The transition to Capitalism created an emerging bourgeois class, "the by-products of industrial capitalism",[9] who were still insecure in terms of their social identity and position,[10] as well as a working class with whom they had an adversarial relationship. The transition to a capitalist system introduced new forms of buildings and involved a fundamental change in how public and private lives were both lived and perceived.[11]

European capitals were being physically transformed in the latter half of the 19th Century, reorganized to reflect new bourgeois values: the control of flow, and visibility of people and public display based on public spectacle of the commodity.[12] The total redesign of Paris, which was carried out by Baron Hausmann and Emperor Napoleon III after the revolution of 1848, defined by the building of straight, wide boulevards, [13] was carried out to promote the flow of people, traffic and commerce. But this was undertaken also to control the working class and assert the power of the state through the monumental architecture to "celebrate the values of the new bourgeoisie by prominently housing this class along the boulevards". As Richard Sennett notes,[14] the "right to the city" was defined as something for the bourgeois class, who shopped in department stores, sat in cafes whose windows faced the street, and strolled down Hausmann's expansive boulevards. Public spaces were therefore redesigned to promote a certain type of display and homogenous mix of people, and to make it very clear that some individuals did not belong within the new 'public'. The commodified world became one of appearances, where interactions in public space were not continuous, but based on silent observation. Sennett[15] describes the middle class 'public' experience of this time as one of being within crowd of strangers that are of the same socio-economic class and yet observe each other in silence, without interaction.

Faced with a complete erosion and radical shifting of the parameters of public life, the private, middle-class, home became increasingly seen as an idealized refuge, as well as a morally superior space compared with the impersonal and threatening outside world of strangers.[16] The bourgeois home became a protected domain of domestic intimacy from where the first 'real' relationships originated, which made both the transgression and potential invasion of the private home by the outside world as an ever-present source of anxiety and fear. As Sennett concludes, "By contrast, 'private' meant a world where one could express oneself directly as one was touched by another person; private meant a world where interaction reigned, but it must be in secret [. . .] In the spectacle, few men play an active role".[17]

The social and economic construction of the identity of places has have been further challenged by the emergence of the global economic networks within local geographies. The precariousness of work and identity of the worker, generated by the post-Industrial traumas of the late 20th century, has created a renewed value for place, but in a manner that follows the logic of exclusion and intolerance.[18] This creates new architectures and social formations and paradigms that are based on design paradigms of

sameness, and that impede and possibly prohibit mixing with strangers. Modern fear plays out in home security systems, gated communities and public surveillance as well as "unending reports of danger emitted by the mass-media". Nan Ellin [19] also suggests that "retribalization" and "nostalgia" are modern responses to this fear. Retribalization is a "desire to preserve (or invent) differences", through the formation of distinct groups that identify with each other and have similar intentions and interests, be they regional, ethnic, cultural or ideological. These formations have been "assisted by transnational culture flows of products, capital, people, and ideas, as well as media". Ellin further elaborates that an accompaniment to retribalization is a sense of nostalgia, a return to the past, to the womb, to the mother, manifested in a renewed interest in architectures that represent the return to 'traditional' values and institutions, such as the return to domesticity and the single family dwelling, a reconstruction of the notion of home. The establishment of a community based on shared interests and desires and a growing 'privatism' therefore conspires to produce homogenized social spaces, in which individuals do not mix with others.

Eli Pariser [20] elaborates on these paradigms of sameness when he describes how personalization works in determining what kind of information we become exposed to on the Web. Google, news sources, and social media platforms utilize algorithms that tailor results according to 'relevance' based on previous user habits, creating 'gated communities' of information by filtering out access to new ideas, people and information. This creates a shift in how information flows online and generates "your own personal unique universe of information that you live online". Faced with digitized information gatekeepers it is difficult to have any sense of public life, because the possibility of encountering people and phenomena that do not necessarily fit into what a search engine decides is one's worldview is hindered, and perhaps denied.

Friedland and Summer's cybercasing study, though developed to promote public awareness, has the unintended effect of perpetuating an 'architecture of fear' (from Nan Ellin), bringing the 19th Century uncanny experience of the home invasion into a 21st century unease about the revelatory power of technology, the risk of personal disclosure and insecurity over identity, the notion of borders and a general sense of place. By making people fear each other, what occurs is reemphasis on the problematic notion of a public that is a strange and malevolent threat to the individual and private domain.

Media theorist Geert Lovink,[21] when recently asked to comment on the future of Net politics, both challenges social and informational homogeneity and actively seeks out the foreign and strange when he says: "Let's dream up unlikely relations, spontaneous encounters (and how to solidify them) and technologies that actively derail everyday routines [...] What's missing is the 'sweet stranger' element [...] What's out there are random encounters with a cause. Networks are not just replicates of old ties. They bear the potential of something other, of becoming society. Let's leave the remediation age behind us and start to fool around with dangerous design". By taking up this position, Lovink embraces the potential of the uncanny within a networked society, by looking at the experience of disorientation upon encountering something that resides outside the comfortable notion of the everyday. Spontaneity, randomness and even elements of danger can possibly lead toward something that is unlike the self as well as the communities of which people are part.

Thinking about Lovink's statement, I cannot help but imagine how dangerous design could be mapped onto cities. Going back to the contemporary practice of geotagging media, if online information is becoming ever more merged with physical geography, and being produced by people actually living in the city, how could unlikely encounters be experienced in urban space using this media? If media is now connected back onto the city, what could future, alternate ways of exploring urban spaces be?

Perhaps mapping information on the web and transposing or layering back onto the city can lead to un-expected journeys towards places and people, and in way that embrace the risk, subversion, playfulness and the potential of something other these potential encounters could entail. This could be described as a type of dangerous design–media that acts as guides towards strangers.

At the risk of leaving these questions hanging, and possibly lead to even more, I want to return to a personal experience of traveling through a city and trying to find the house that I have watched being built. Having already–virtually–been in the home, I am now traveling towards it. I have a computer on my lap; the satellite imagery and video tell me where to go. After a few dead ends, a wrong turn down a road, a false ending at a cow pasture, I finally end up at the geotagged, recently-constructed family house. The house is now completely finished, lace-curtains fitted within the windows, the outside façade painted a cheerful color of yellow. There is no car parked outside but I am hoping that they are at home. I deliberately transgress the ethical, critical, geotagged space by standing at a threshold of the most contested space of conflict between private and public space, the social and physical border between the private family home and the outside world. Following Friedland and Summer, I have become a 'cybercaser', but this time I am benevolent. I am standing on the threshold and ready to transgress it.

I stand on the doorstep and ring the doorbell.

References and Notes:

1.http://www.youtube.com/user/clachi70#p/u/30/7v0dd_vwgIA (07/04/10)

2.http://pleaserobme.com/ (03/15/10)

3.http://icanstalku.com/ (05/15/10)

4.http://ilektrojohn.github.com/creepy/ (05/15/10).

5.http://www.icsi.berkeley.edu/pubs/networking/cybercasinghotsec10.pdf (05/20/11)

6.Friedland & Summer, 4–5

7.Anthony Vidler, The Architectural Uncanny(Cambridge:MIT Press, 1992),11

8. Vidler, 4

9.Nan Ellin, "Shelter from the Storm or Form Follows Fear & Vice Versa," in Architecture of Fear, ed. Nan Ellin (New York: Princeton Architectural Press,1997),16

10.Richard Sennett, The Fall of Public Man,(London:Penguin Books, 1974),130–149

11. Ellin,14–19

12.David Harvey, "The Political Economy of Public Space",The Politics of Public Space, ed Setha Low & Neil Smith(New York:Routledge, 2006), 17-34

13.Ellin,19

14.Richard Sennett, The Fall of Public Man,(London: Penguin Books, 1974), quoted in David Harvey, "The Political Economy of Public Space" in The Politics of Public Space, ed Setha Low & Neil Smith(New York: Routledge,2006),17-34

15.Sennett,214–217

16.Ibid,19–20

17.Ibid,17-34

18.Richard Sennett,"The Search for a Place in the World",in Architecture of Fear, ed.Nan Ellin (New York:Princeton Architectural Press,1997),61–62

19.http://www.ted.com/talks/eli_pariser_beware_online_filter_bubbles.html (03/30/11)

BETWEEN PAST AND FUTURE: COLLABORATING IN THE CITY SPACE

Mikkel Thelle

As most european cities and towns, the danish capital Copenhagen has many different layers. These spaces and their meaning is of interest to many different positions: planners, artists, historians, urban developers, museums, researchers etc. Through a web-based 3D-environment and mobile technology, the parties involved in the city can collaborate in a way that visions, history and existing rules will impregnate each other.

In cities, and especially in the cities of modernity that grew rapidly during the industrialization, the change of physical form is one of the key characteristics. Old streets become part of mundane shopping malls, buildings are torn down to give space for new, former industrial areas become sites for creative classes, and so on.

This change is happening more and more quickly, at least when the forces of the market are strong, and they have a deep connection to our cultural history. Some changes, like the implementation of infrastructural networks, can last for decades, maybe centuries, while other come and go so fast we might not even notice it as ordinary dwellers of the city. So the modern city is a complex interplay of more or less resistant layers, all the time changing in different speeds and influencing each other. In Judith Butlers words, the world is a knot in motion. But how are we to capture, let alone understand this complexity?[i].

Furthermore, the city involves a range of groups that all have part in the culture and physical changes of the past, and all have an interest in the changes towards the future. The politicians of every period has left traces and will want to influence the city in all future; the urban planners that are trying to provide an orderly city within the political framework; developing firms and others carrying out large projects to change urban space for long periods of time; social groups defending their local or general interests; and so on. What is the pattern of this whole influencing and how does it affect our physical surroundings[ii].

What is interesting here is that there is a large amount of sources to this history of change and influence in the urban cultural history. Piles of technical documents fill the municipal departments in the major cities; Libraries have lots of press material, posters, drawings and pamphlets on the city; local and national archives keep accounts of life in the city, of riots, markets, dance halls, marriages and funerals. And for each year, more and more of this material is digitized. In Copenhagen where I come from, the city archive will undertake a total digitization within the next years of the most popular material; the national library has already taken part in this process, since only 10 percent of their loans are still "real" books – the rest is digital. So these sources are reaching an overwhelming size, and a problem of the future will be how to make them understandable for ordinary people who has no training or interest in archival techniques.

As Istanbul and most other cities and towns, the danish capital Copenhagen has many different layers of physical buildings and structures, but also of stories and meaning attached to the spaces and places of the city. As the streets of Istanbul and Copenhagen was probably clad with aspalt at the same time, a

thing like the tram system was implemented in Copenhagen just before the first World War and in Istanbul I think just after. Most modern cities share these experiences[iii].

One of the profound changes in Copenhagen was the establishment of a new city center around a space that would become the Town Hall Square, and where around 1900 people, traffic and prominent buildings were attracted around the new, monumental Town Hall in national romantic style. Just a little more than a hundred years ago, this place was just a places of scattered buildings on the western gate of the city wall. Almost impossible to understand for people who do not know the story[iv].

Today the square is a hub of thousands of people, cars and public buses, soon also a subway. Large events such as TV shows, music awards and rock concerts are held at the square on a regular basis.

What happened in the meantime? Years has passed, two world wars, at least one depression, technological revolutions, political demonstrations and much more. In the search for ways to understand the change, and not least try to pass that understanding on to an interested public, I think an effective tool could be digital media. One of the characteristics of these media and the ways they have developed in the last years are the easy and yet sophisticated ways of collaboration they provide – and which could be a motivation for a public to actually get involved in the cultural history of the city. Furthermore, collaboration through visual, digital media could be an alternative way of discussing the development of the city.

First of all, if the multiple sources to the urban cultural history should be able to provide any insight for the public, they should be organized dynamically and intuitively. The systems used for storing and finding them in archives are developed by and for professionals, and they become a barrier for people without training. If the information, then was organized and mapped around well-known objects, that could activate them, this would make it easier. If these objects were also the ones the sources were about, a double goal would be reached: a general accessibility for the public would be in place, and an element in a powerful collaboration tool could be developed[v].

Just a few years ago, technologies for visualizing information digitally was about getting Geographical Information Systems to work on the Internet. This has changed dramatically. Constantly updated mappings of complex data sets are streamed directly through broadband or optical fibres into the living room of ordinary people. One of the technologies that has been revolutionized, as we shall see in another of the day's papers, is 3D representations. Through the active community of massively multiplayer games like Second Life and free applications like Google SketchUp, the 3D technology is now possible to use in a variety of practices on an intuitive and qualitatively high level[vi].

Another cluster of technologies that has become part of everyday practice for many people is the localized technologies. Geocaching, GPS, mobile gameplay and Foursquare are just a few of the activities that has been blossoming the last few years. Everyone with a smartphone is by now well aquainted with either mobile maps or pervasive layers, where information has been pasted over the experience of the real world in front of your eyes. One potential for this technology in relation to cultural history could be in the combination of the real space experience and the access to information about that exact space[vii].

A third form of technology, or rather technological idea, that i would emphasize is the concept of object history. If you go to Wikipedia and look up a phenomenon, you can follow the creation of the specific

post step by step to see how it has emerged and who was responsible for the changes. In a digital representation of the built environment of a city, this concept is extremely central, conveying the steps by which this space has been created.

And imagine if this history could be organized in a 3D space, so that the different elements of an urban structure would have attached the date and, for example the planner or architect responsible. If also the bulk of evidence I mentioned earlier would be accessible in this framework, it would begin to be interesting. And finally, if at any step in the framework, you, the user could step in and leave comments, share images or discuss future problems like for example urban development projects.

If, furthermore the 3D-version of the city space could have a corresponding, mobile interface, where people in the specific space could experience the past and future city in layers that were accessible, it would, I think, have a long-lasting potential for developing smart cities where the city builders, artists and cultural historians could collaborate.

References and Notes:

1 Anique Hommels, Unbuilding Cities, (MIT Press, 2008) 2 Henri Lefebvre, The Production of Space, (Oxford, 1991) 3 Wirth, Louis, "Urbanism as a Way of Life", The American Journal of Sociology 44 1938 4 Barbara M. Lane, National Romanticism and Modern Architecture in Germany and the Scandinavian Countries (Cambridge University Press, 2000) 5 On the concept of intuitive digital collaboration, see Morten Søndergaard, ed., RE_ACTION : The Digital Archive Experience. Renegotiating the Competences of the Archive and the (Art)museum in the 21st century, (Aalborg Universitetsforlag, 2009) 6 For the gaming story se for example Edward Castronova, Synthetic Worlds: The Business and Culture of Online Games, (University Of Chicago Press 2006) 7 For more about working intuitively with this, see Pranav Mistrys project Sixth Sense http://www.pranavmistry.com/projects/sixthsense/ or hear him at TedTV http://www.youtube.com/watch?v=mzKmGTVmqJs

PLAYING WITH THE CITY

Iouliani Theona & Dimitris Charitos

This paper aims at exploring the nature of the spatial experience that emerges when actively pursuing the goals of a pervasive game, in order to inform the design of pervasive gaming experiences.

This paper aims at exploring the nature of the spatial experience that emerges when actively pursuing the goals of a pervasive game. Pervasive games engage the player in intense and rich activities that spill out of the screen of their technological medium into the real world, creating thus hybrid and mixed reality environments that bear similarities with those afforded by other non ludic platforms, such as mobile and locative media. This research expects pervasive games to be an integral facet of future urban condition and considers the study of their spatial characteristics, as offering useful insight into spatial design in the urban context.

Being part of an ongoing research, this paper will not seek to reach concrete categorizations of pervasive games according to their spatial features. Instead, it will proceed by analyzing four materialized pervasive games, in order to investigate how such playful activity transforms and enriches the spatial experience. The examples are chosen with regards to the manners in which they incorporate the urban landscape into their design and the forms of interaction with the built environment that the players engage in. These games are being perceived as a means of urban re-discovery and spatial exploration. Approaching the built environment through such a playful context can lead to revealing appropriations, changing of perception and destabilization of spatial preconceptions. The player can make use of the architecture and the technological infrastructure of the city in original, unforeseen ways. She can play with the city itself.

This paper adopts the definition of pervasive games suggested by Montola, Stenros and Waern, according to which these games blur the 'magic circle' and expand it spatially, temporally and socially. [1] The term 'magic circle' introduced by Salen and Zimmerman, [2] echoes the notion of Huizinga that games are closed systems which unfold within a defined play space – a board for instance. So by challenging the boundaries of the 'magic circle' Montola, Stenros and Waern imply that in a pervasive game the participant can play with anyone, anytime, anywhere, usually in urban settlements.

"BotFighters", launched in 2001, is one of the first commercial attempts of this category of games. In "BotFighters", the player tries to destroy her enemies by shooting them. The mobile platform deploys GSM networks, so when an enemy moves within a certain radius close to the player, the game begins. The communication of the position of the enemy, as well as the shooting, occurs through the dispatch of sms. [3] Also, text messages notify players on the existence of virtual objects, dispersed throughout the city by the developers, which may be helpful in the progress of the game. For instance, while a player is walking down a street, she may be notified and thus discover a weapon or a first aid kit. Efficiency in destroying ones enemies is based on proximity and the amount of imaginary objects a player has collected. Physical positions as well as game actions are described solely through text, yet at the same time the game presents a bodily challenge. The player roams in the city looking for opponents or avoiding ones, largely based on her imagination to enhance the gameplay. Concurrently, she explores an invisible layer,

on top of the built one, that of the GSM network, trying to figure out its coverage and its weaknesses, areas where she can hide, or be seen.

In the case of "PacManhattan" ludic action takes place in a 5x6 block area of Manhattan. This example is based on the concept and the aesthetics of the original computer game. One player assumes the role of Pacman, while three others those of ghosts. All four players circulate in that certain physical game area, with the use of a printed simplified representation, a map. No location tracking technology is available. Every player is in constant communication with a controller through a mobile phone, informing about her position when she reaches a crossroad. Subsequently, the controllers update a networked map, visible only to them. There is an interesting asymmetry in the disposal of information. Pacman is aware of the positions of all the players, while the ghosts are only told their positions, and can only assume where Pacman is based on the presence or absence of virtual dots at their location, that signifies whether Pacman has been there before. "PacManhattan" can be said to create two adjacent worlds, none of which has a complete perception of the gaming situation. Instead, controllers and street players must communicate and work together, so as to combine both perspectives in a coherent whole.

"Can You See Me Now" (CYSMN) is a game of catch, where online players are navigating in a virtual model of a specific city, each time, while being virtually chased by street players, actually running around in the built environment. Both groups of players are represented by avatars and have access to a digital map that reveals their positions. The online players can move within this abstract representation at a fixed speed. They can identify buildings but cannot enter in them, so they are limited to the streets of the model which are bereft of people, vehicles, traffic lights, in general the nuisances and the hazards of everyday city life. On the contrary, street players, while running equipped with portable devices and GPS receivers, have to overcome real obstacles. The players can exchange text messages with each other, and the runners can communicate via a walkie-talkie channel that is available as a real time audio stream to the online players. [4] "CYSMN" creates a hybrid reality, combining the physical world and its virtual representation. These two worlds do not overlap completely. Rather, there are points of connection, of superimposition where the various modes of information and communication devices create a novel experience. The online mode of participation enabled players from different cities, let alone countries, engage in the game. The most challenging and fulfilling aspect for those players, who weren't familiar with the particular area where the game took place, was to try to understand, to decode the city's physical characteristics and constraints and manipulate their movements and consequently the game actions of the runners, for their benefit.

"Epidemic Menace" is the last case under analysis here. The plot of the game involves agents that need to track down lethal viruses which have escaped a lab, before they spread and multiply. "Epidemic Menace" is a research prototype aiming to explore how various interfaces and devices contribute to the gameplay. It makes use of desktop computers, mobile and augmented reality technologies. Contrary to multiplatform games, "Epidemic Menace" associates different functionalities and also views and representations, with each interface, so players can alternate between them and obtain a more coherent and complete experience. [5] "Epidemic Menace" took place in a specific site, in a university campus, where virtual viruses were located and had a specific duration. Still, with regards to its spatial characteristics, this game didn't only augment physical environment, but was also adaptable to the change of its conditions. For instance, environmental factors such as wind strength influenced the way the viruses move, or temperature, the way they multiplied. It can be suggested that "Epidemic Menace" was important because by incorporating degrees of uncertainty in the design, this game revealed the creative and entertaining potential of such practices.

To conclude, pervasive games embed the game play within the pre–existing built environment, as well as within a digital layer of information which is superimposed on top of this physical realm. This ongoing investigation currently explores the implications of this integration, in order to understand the nature of the spatial experience afforded by this category of games. Furthermore, it focuses on the following relevant issues:

- The way people navigate and move in such a hybrid environment.
- How participants in a pervasive game access information while playing.
- How locative technologies influence the way public, urban space is perceived.

Ultimately, this study aims to inform the design of pervasive gaming experiences.

References and Notes:

1. Markus Montola, Jaakko Stenros and Annika Waern, *Pervasive Games: Theory and Design* (New York: Morgan Kaufmann, 2009), 12.
2. Katie Salen and Eric Zimmerman, *Rules of Play: Game Design Fundamentals* (Cambridge, MA: MIT Press, 2004).
3. Olli Sotamaa, "All the World's a BotFighter Stage: Notes on Location-based Multi-user Gaming," in *Proceedings of Computer Games and Digital Cultures Conference*, ed. Frans Mäyrä (Tampere: Tampere University Press, 2002), 35-44.
4. Steve Benford, et al., "Can You See Me Now?" in *ACM Transactions on Computer-Human Interaction* 13, no. 1, (2006): 100-133.
5. Joel Fischer, Irma Lindt and Jaakko Stenros, "Deliverable D8.8: Epidemic Menace II Evaluation Report," IPerG Web Site, December, 2006, http://iperg.sics.se/Deliverables/D8.8-Part-II.pdf/ (accessed September 2, 2011).

MAPPING BY OURSELVES: TOWARDS A MEDIA HISTORY OF GEOMOBILITY

Tristan Thielmann

Using the example of three different augmented reality and social media navigation applications, this paper demonstrates the importance of choosing the genuine mobile, rather than the stationary, as the starting point of media historical examination.
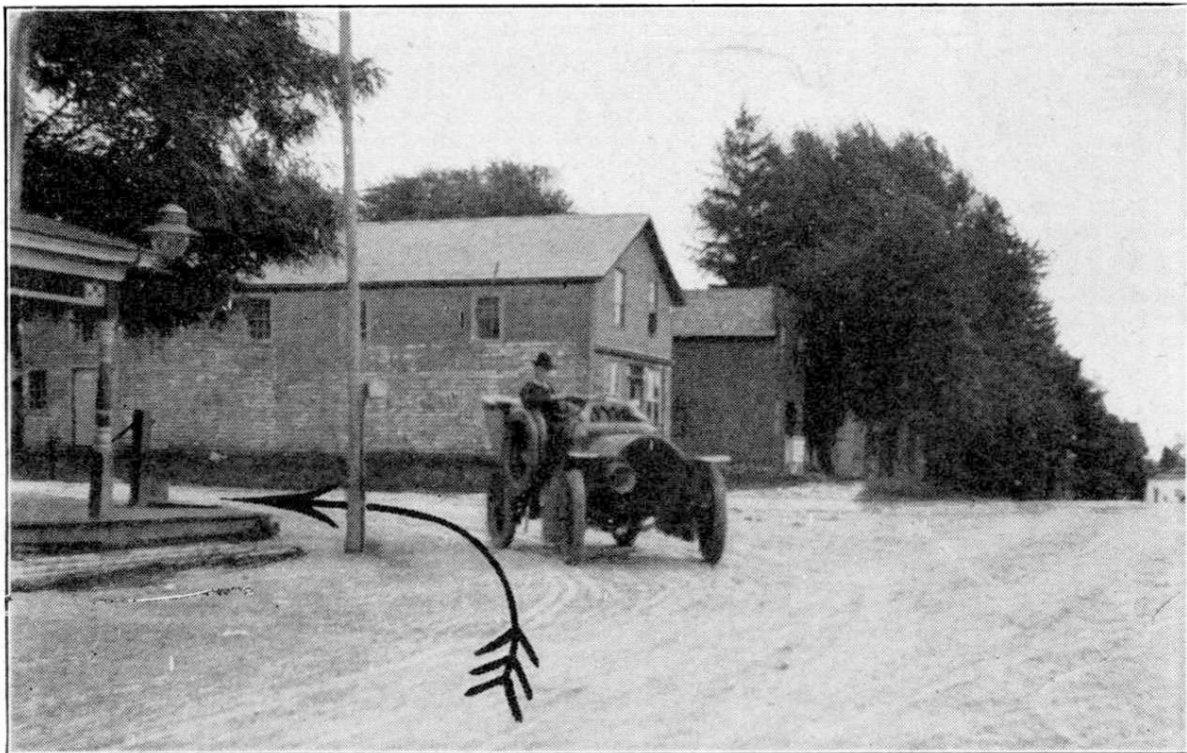
TO LEFT, EAST

Half Day. Next turn C. & N. W. tracks. Highwood, six and one-half miles.

Fig. 1. Photo no. 18 of The Rand McNally Photo-auto Guide: Lake Geneva to Chicago (Chicago, New York: Rand McNally & Company, 1909).
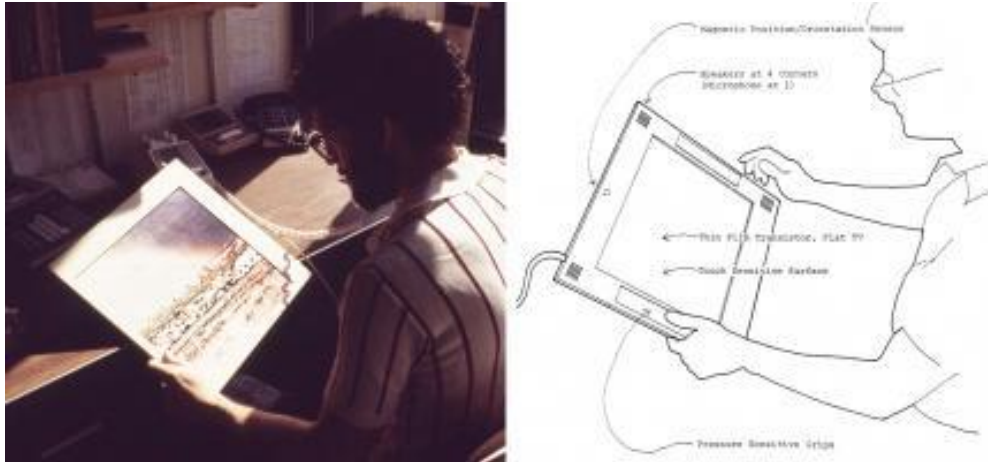
Fig. 2. Dummy (left) and conceptual diagram (right) of equipment for hand-held mapping window.

Fig. 3. (No) live map of Waze in the area around Munich (http://world.waze.com).

0. Introduction

In general, there is an understanding in media theory (for instance, in the interpretation of Paul Virilio and others) that implies a logical continuance in a sustained acceleration from the immobile to the mobile, from the stationary PC to the laptop, to the mobile smartphone, to some nanotechnical device in our brains, and so and forth. This paper aims to show that it is worthwhile to take the opposite view: to take the mobility of media as an antecedent, and the stationary as a transitional stage, because these heuristics return data (Latin 'dare': as something given) to their ontological status.

Although augmented reality navigation apps like 'Wikitude Drive' (www.wikitude.com/en/drive), which can be downloaded from the Apple App Store or the Android Market, appear at first glance to be something completely new, they are in fact based on a very old cultural technique.

1. Navigation in 1907: Photo-auto guides

Virtual travel through pre-recorded spaces can look back at least to the year 1907, when the first attempt at capturing residential streets of select routes in photographs took place. The idea was to make them available as 'photo-auto guides,' with textual and pictographical route instructions superimposed.

Photo-auto guides lasted for only a couple of years before they were displaced by route books and, later, by road maps. But photo-auto guides existed before road maps were publicly available, and they were widely distributed. [1] Why did they fail? Why couldn't they accumulate collective knowledge? This is, to use a term of Bruno Latour's, a question of "optical consistency." [2]

Part of the answer lies in the fact that, while photo-auto guides placed a great deal of emphasis on establishing a kind of navigational first-person experience, this was not sustained, not standardized, and could lead to frictions. Figure 1 makes clear that the visual language was not maintained. While the navigation instructions were layered within a series of photographs as if arrows had been drawn in the dust of the streets, some photographs showed ghost drivers who were driving in the opposite direction to that indicated.

In addition to this, there was a problem with the medium itself, and its mimetic qualities, which also caused disadvantages. In Europe, where nearly all roads had macadam and had been surfaced for years, it was possible to issue maps that did not go out of date. But in the U.S., people were only just beginning to realize the value of good roads at the beginning of the 20th century.

"Often one notices a new highway where a year before another one has been used to get to the same point. This shows the uncertainty of routing," stated John P. Dods in his article "Advancement in Art of Pathfinding" (1911). The roads themselves were constantly changing, so there was uncertainty about the accepted routes.

As the infrastructure as well as the tracers/vehicles moving about on it were mobile at that point in time, the use of photographs or maps could not result in the creation of "immutable mobiles," a constancy in form across variation, that allows organizations to collect information and to exert control over spatial distances. In order to understand the relevance of these mobile fixations, we initially need to take a step back and look at the big picture.

In his studies in media ethnology and the sociology of technology, Bruno Latour traces the transmission of signs and the linking of people, artifacts and signs via mediators, delineating the logistics that make changes of scale possible. Seen from a media studies perspective, this enables the writing of a media history founded on the concept of mediation and drawing on the comparative analysis of multiple short chains of media translations, as well as on the tracing of cumulative technological developments.

For the history of inscription devices, this means that you have to focus on the invention of "objects which have the properties of being *mobile* but also *immutable*, *presentable*, *readable* and *combinable* with one another," [3] because the more artificial and abstract the inscriptions, the greater their capacity to be associated with others and thus to approach reality more closely. The degree of similarity serves as an index in a chain of association, which leads, seemingly unavoidably, to standardization and institutionalization within "centres of calculation." [4]

Coming back to our case study: As the roads as well as the vehicles moving about on it were mobile, and therefore no 'immutable mobiles' could be generated, how could knowledge be gained? It was difficult with established epistemic methods, and so the publishers took up a new idea: they would produce maps that contradicted the scientific geodesy and cartography of the time – just as neogeography and other grassroots movements do today.

To produce these maps, cars were sent out to gather the information for route directions. In each car was a sketch maker who had to be able:

1. to record "all route matter in the form of a sketch showing their proper relations in the road being traveled all intersecting roads, landmarks, schools, churches, railroad crossings, telephone poles, etc." while driving in a moving car on rough roads; and
2. "to imagine himself traveling above the road in a flying machine as it were, looking down, in order to get an accurate idea of the angle at which two roads intersect." [5]

So there was already a combination of real-time recording and a planimetric a-perspectival view, something digital mapping companies are trying to accomplish with GPS survey cars today.

To make the sketches usable for navigation, they were first transformed into texts, then diluted and reduced into the essential information on the route. The factors that emerged as essential were: how great is the distance to where I need to turn off and what landmarks tell me that I should not turn off (in other words, that I am on the correct route)? In this way, the topological structure was georeferenced through a human actor.

Photo-auto guides therefore thwart Latour's media historical observation: The more artificial and abstract the inscriptions, the greater their capacity to be associated with others and thus to approach reality more closely. In place of photo-auto guides, a standard without layering techniques developed that used photographs simply as illustrations, or was purely textual. It was constructed in such a way that for each change in route, all the navigator needed to read out was: 'After ... miles at ... turn ....'

The intermediate result of this observation is that the problem with photo-auto guides was, among other things (e.g. the absence of scalability), their lack of optical consistency, as they were not in a position to follow an abstraction process and create 'immutable mobiles.'

2. Navigation in 1977: Mapping by Yourself

'Mapping by Yourself' was the MIT Architecture Machine Group's forerunner to the 'Aspen Movie Map,' which is acknowledged as "the first publicly shown interactive virtual navigable space." [6] The 'Aspen Movie Map' offered virtual travel through pre-recorded spaces. A videodisc-driven program, it allowed the user to navigate on-screen through the streets of Aspen by choosing new directions at each displayed crossroad. To do this, the user touched left/right arrows that were graphically overlaid on a touch-sensitive screen. It was also possible to stop, view houses, meet people, or even to change the season.

However, the original project, 'Mapping by Yourself,' was even more ambitious. The first DARPA-funded project of the Architecture Machine Group was designed in 1977 as a flat, hand-held PC with a touch-sensitive display that knew its own perspective and position and worked with a 6'' x 6'' Westinghouse

display (Fig. 2). The technique for sensing the panel's orientation and position was initially based on ul-tra-sonic sound ranging, but later switched to a position/orientation sensing system produced by Polhemus Navigation Sciences and based on measurements made of a neutating magnetic field. This system was implemented within MIT's media room.

There are, of course, many similarities between this device and tablet computers. However, the initial idea of 'Mapping by Yourself' went far beyond what an Apple iPad, for example, is able to do nowadays: "The resultant display would give a user the sense of holding a 'magic window' through which he could observe an otherwise invisible world about which he could move in 'real' world fashion." [7] One idea for an application was "to move the window to any vantage point for 3-D views onto a 3-D geographical model. This will permit the user to look down on an environment in conventional map format, then to move the window for an aerial perspective or even to position the screen vertically, so as to see surface features in elevation and subsurface strata in section." [8] A guided tour application that could be used by soldiers in unfamiliar territory was also envisaged.

'Mapping by Yourself' should be been as part of a series of 1970s technological inventions at MIT that had new graphical user interfaces specially developed for laymen, such as 'Architecture by Yourself' or 'Camouflage by Yourself.' However, the objective of 'Mapping by Yourself,' "to make map reading at one with map making," was not accomplished [9]. Why was this the case? The reason lay not so much in the technical difficulties experienced within the Architecture Machine Group as in the lack of consideration that was given to incorporating the accumulated information into a center of calculation. There was no immutability.

We have a similar problem today: It is a misunderstanding to think that it is the locality itself that matters, if we talk about 'locative media' or 'netlocality.' Instead, it is the form, the inscription into a grid, that makes the difference. And this is what was not considered in 'Mapping by Yourself.'

Considering the two examples presented in this paper, we have now seen:

1. centers of calculation without optical consistency in the layering process, and
2. optically consistent layering without immutability, without centers of calculation, without inscription into a social structure.

3. Navigation in 2011: Waze

The final example is the social mobile app 'Waze,' which relies on crowdsourcing to build and update road maps. The basic idea of Waze is that in order to get wherever they need to go to as quickly as possible, people can download the application onto any smart phone with GPS functionality, and it will provide a driving service including real-time traffic and accident alerts, as well as free turn-by-turn navigation.

However, the specific is not the media product itself, but the embedding of its form of production. "The live maps, updated in real-time, are the heart of the system." [10] The company generates these maps by tracking GPS on users' phones. In the beginning, there is most often no map at all (Fig. 3). When there are at least three users driving along the same route, the platform takes this data and uses it to create a road map and traffic information. A one-way street, for example, is recognized as long as there is no one driving the other way.

Di-Ann Eisnor, community geographer of Waze, describes the system as follows: "Just by turning it on and driving, we are able to collect information on the GPS traces, the time stamps, the road directions – essentially to create a fairly accurate grid of information, and we are turning it into a navigable base map that has traffic as well as social layers and special driving attributes on the top of it, all from the mobile device." [11]

Thus far, Waze resembles the geodetic knowledge gaining outlined by Latour: The medium gains in accuracy by maximizing mobilization and immutability. The more drivers use the application, the more up-to-date and accurate the maps and the associated data become. "The many places where these texts are synoptically assembled offer many counterexamples [...] These counterexamples can be added to the old texts and, in turn, are spread without modification to all the other settings where this process of comparison may be resumed. [...] So, at the end, the accuracy *shifts from the medium to the message* [...]." [12]

Therefore, Latour's mediation theory not only has the potential to explain the phenomenon of the time-lag between the introduction of a medium and the point at which visual representations within this medium become precise, it also contains a media-historical narrative that passes right across analogue and digital media, right across human and non-human beings.

However, there is one difference in the accumulation process, and this has a lot to do with the difference between analogue and digital media: If you read Latour carefully, you will recognize a shift from media as "centres of calculation" to media as "platforms of calculation interfaces." This indicates a general shift in Latour's thinking from BC to AC, 'before the computer' to 'after the computer' – a shift that can be very well explained by looking at the evolution of digital cartography, as Latour does in his paper "Entering a Risky Territory." [13]

The difference lies in a fundamental ontological distinction between "looking at a medium" and "logging into a media platform," e.g., a databank inquiry, a Web search, etc. It is in fact making a distinction between parasitic mimetic media usage and practical navigational usage. Latour asserts that digital technologies have reconfigured our understanding of mapping, such that navigational interpretation of digital maps is increasingly taking precedence over their mimetic interpretation.

Media are thus no longer just mediators, but platforms that permit both mimetic and navigational usage, platforms that create a bridge between the different oligoptica. Even if Latour takes a stance against a mimetic interpretation, his understanding of the option of a retrospective distinction between mimetic and navigational use of digital mapping assumes that both conditions can always also exist in action. This understanding is, indeed, substantially different from that of Latour's early papers.

The term 'platform' thus represents a modification of Latour's media understanding, a turning away from "centres of calculation" towards "platforms of calculation interface" that rely on different closely neighboring "stepping stones in order to achieve the miracle of reference." [14] This interpretation allow us not only to call for a theoretical conception of interfaces as Latourian quasi-things (inscribed with programs of action) that are dealing via Facebook and other social media platforms with quasi-people (prototypically demographic types), but also to mark a general conceptual shift in perspective.

So far, media have been seen as something immobile and 'still framing' in media history and media theory, as processing immutable mobiles (data) and retaining (storing) them. Even the notion that today's

media practices are the apparent logical continuance of a sustained acceleration only supports the assumption that an alleged deceleration would lead us back to the basis of the statical. Rather, the establishment of mobile media allows seeing data (software) as something given to mobilize media. This heuristic returns data to their ontological status. Even more: If it is not the stationary (PC, TV, etc.) that is chosen as the starting point of examination, but rather the genuine mobile (hand-held devices, paper, etc.), a new disciplinary field of Software Studies opens up, and media history realigns. From that perspective, the mobility of media consequently appears as an antecedent, and the stationary as a transitional stage.

References and Notes:

1. *Walter W. Ristow, "American Road Maps and Guides," in The Scientific Monthly 62, no. 5 (1946): 397-406.*
2. *Bruno Latour, "Visualisation and Cognition: Drawing Things Together," in Knowledge and Society 6 (1986): 7.*
3. *Ibid.*
4. *Bruno Latour, Science in Action: How to Follow Scientists and Engineers Through Society (Cambridge, MA: Harvard University Press, 1987), 215ff.*
5. *John P. Dods, "Advancement in Art of Pathfinding," in Motor Age 20, no. 6 (1911): 4.*
6. *Lev Manovich, The Language of New Media (Cambridge, MA: MIT Press, 2001), 259.*
7. *Mapping by Yourself, proposal to Advanced Research Projects Agency (Cambridge, MA: Massachusetts Institute of Technology, 1977), 15.*
8. *Guy Weinzapfel, Mapping by Yourself: A Multi-Media Paradigm for Computer Based GeoGraphics (Cambridge, MA: MIT, 1978), 3.*
9. *Ibid., 1.*
10. *Waze Ltd., "Guided Tour: How does it Work?," Waze offical Web Page, http://www.waze.com/guided_tour/ (accessed July 15, 2011).*
11. *Di-Ann Eisnor, interview by the author, San Jose, April 1, 2010.*
12. *Bruno Latour, Science in Action: How to Follow Scientists and Engineers Through Society (Cambridge, MA: Harvard University Press, 1987), 12.*
13. *Valérie November, Eduardo Camacho-Hübner, and Bruno Latour, "Entering a Risky Territory: Space in the Age of Digital Navigation," in Environment and Planning D 28, no. 4 (2010): 581-599.*
14. *Ibid., 582, 586.*

TOWARS A NEW SYMBIOSIS IN THE MEXICAN ENVIRONMENT: ART & SCIENCE

Reynaldo Thompson & Juan Angel Mejia

In contemporary art the most recent artwork of Gilberto Esparza deals with microorganisms, environmental issues and electronic media. His project *Plantas Nómadas* navigates the everyday life urban ecosystem. His work is based on the recycling of consumption technology, human wastes and a robotic mechanism that survives from served waters and solar energy.

Introduction

From the outset of civilization, human beings have tried to express some of their ideas, fears and emotions through art. One of our deepest fears today is the continuous destruction of nature and the irreversible alteration of the ecosystem. This concern has reached the art arena together with the sciences, both of which, in cooperation, create tools for new expressions, perhaps as solutions for the apparently uncontrollable problem. The results are broadening the limits of art and science beyond unrecognized limits. The artworks we study in this context are examples of this process.

The evolution of informatics systems, hardware, and the arts have revolutionized the way we perceive the world and by consequence the aesthetics of arts itself. Few are the cases in daily life where digital process is not playing a role in modern existence and thereby enabling us to fulfill our tasks in the world.

With the use of these new tools, many human activities have undergone changes, sometimes, not in the right direction: uncontrolled materialistic consumption may be one of the causes. The development of the web has become a tool and a weapon for globalization, a concept strongly tied to those concerns. Today, the global frontiers are blurred, time is relative, and perhaps the only limitation is the capacity of reception and transmission of data, depending on the levels of technological advancement in the region.

Antecedents of *the Project Plantas Nómadas*

For instance, to observe the robotic creatures *Parásitos Urbanos* (Urban Parasites) of Gilberto Esparza is to pass through the lens of the future, and believe that the most disturbing images like those found in the painting *The Garden of Earthly Delights* of Hieronymus Bosch have become true. It makes us feel, in a way, that we are entering a sort of the *Gate of Hell* in Dante's *Inferno* or into the space of a science fiction novel. This is not because the goal of the artist is to intimidate the viewer, but rather the opposite: his works pretend to become a saver device of humanity after the damage already done to earth.

The physicality and size of *Parásitos Urbanos* are not like the microscopic organisms that enter our body and which we are not able to see; nor are they like the new invented sicknesses that are globally widespread today; and neither are visible to the so called viruses made to affect computers. It is true that not all parasites are microorganisms; however, Esparza's mimetic parasites are depictions of living creatures

that are mechanized and autonomous to some extent. In this case, they have not evolved in nature as the rest of living species, but in the creative mind of the artist. The devices are designed to obtain their requirements of energy from existing sources like electric lines, solar energy or batteries - in order to move and call the attention of viewers - while at the same time emitting sounds, like animals that roar, sing or tweet in order to call the attention of their partners. The artist's robot emits sound in order to call the attention of the viewer by emulating zoosemiotics.

At first glance the devices seem to be part of the ecosystem in which they inhabit but once we pay close attention to their movement, we realize that they have an independent mechanism.

Esparza is not only working with scarce technology within the arts, creating quasi-mechanized creatures living from the wastes of the city, he is as well, tackling one of the most destructive problems faced by humanity, the destruction of the environment and the problems generated by the overpopulation of humans.

The Biological Side of the Robot

Plantas Nómadas is a concept that includes micro-organic plants contained in unhealthy waters (Geobacter) and a robot living in an environment, which has been rendered hostile after transformation by means of human activity. The plants have been transplanted from the soil and adapted to the new ecosystem. Its nomadic condition allows it to adapt and find nutrients with the help of the robot.

This artwork is an example of the lack of human consciousness destroying the planet, and the persistence of care for the planet. By observing the piece in its environment we can contemplate how the robot takes residual water, separates its elements and ignites the motor of the robot by providing energy.

The piece is a prototype of a hybrid organism developed in symbiosis by being constituted out of electro-mechanic, kinetic and biotic systems. Its electro-mechanical construction works with the help of biological cells cultivating a diverse spectrum of bacteria that transforms the glucose and the amino acids, releasing microvolts of energy. The energy is accumulated inside a harvest system, providing autonomy to the whole device. The design of the system uses cybernetics in order to protect the system itself and keep it alive.

The power cycle nourishes the bacterial culture that feeds the electronic system. The purified water that is irrigated to a plant comprises its existential cycle. *Plantas Nómadas* were created in earnest of a concern for the deteriorated environment caused by human activity and its irreversible consequences. These changes are directly hitting all sorts of life on the planet making it imminent that organisms have to, either, adapt faster or perish. During the mission of *Plantas Nómadas*, several organisms adapt themselves to the new environment in order to survive in a symbiotic way, taking advantage from the nutrients found in polluted surroundings. The paradoxical thing is that this symbiosis manages to start off the union of a robot whose origins are in the human imagination and which is yet manufactured in a system that is bound to the modifying surroundings of the natural Earth. *Plantas Nómadas* are a species that come indeed from the alienated processes that the planet is undergoing. It is a robot of inverse understanding, whose vital processes do not need to obey or be in agreement with the structure of capital production. Their behavior, movement and times, are determined by their vital cycle of existence, it is

an organism that exists in contradiction to the acceleration of the world that has been imposed by human dynamics.

The goal of Esparza´s research seems to open the possibility of reversing the alterations of ecosystems and therefore the killing of other species. The pretension is to learn the habits that other species have accumulated throughout millions of years of adaptation and reintegration to the environment and to give back to the Earth, in different form, the energy that it rendered to us. The idea may allow the human species to survive on the surface of the planet.

It is our concern to highlight the lack of water and its pollution all around the world and the possible solutions through the use of a new hybrid organism, which are products of alienated processes. It appears - by the simple act of coexistence in those zones of ecological disaster, to represent, a serious manifestation of social and environmental impacts in the communities that depends on clean water of the rivers.

Ecological Concerns

Plantas Nómadas is a utopian dream of healing the earth, where the waste of uncontrolled human consumption and growth deteriorates and destroys nature. The long known Malthusian theories on overpopulation, [1] demonized by the Catholic Church are not far from truth.

The damage to biodiversity in modern times (in the name of progress) ends up in the paying of a high price. Some solutions may be found with the ethical consumption of resources, an anti- Malthusian consciousness about human reproduction or a strict birth control and a respectful behavior towards nature. If that happens, the earth will continue to feed the living creatures on its surface for many more generations to come.

The united system of knowledge of the sciences and the humanities to which [2] it appeals in his book *Consilience* have found a point of convergence in Esparza's *Plantas Nómadas*.

It appears that the Enlightenment ideals have collapsed not because of a continuous progress in the name of social development but because of capitalist wastefulness. It will be suitable that the work of art in focus will be made for mass circulation, like cars, in order to save the planet. A utopian desire rooted in ecological initiatives.

In formal terms *Plantas Nómadas* is like a Kafkaesque cockroach, nevertheless instead of the human becoming an insect turned upside down, it seems that Esparza's dream is to contribute to reverse a future natural catastrophe. It is a sort of crusade against the evident disregard of nature.

It is quite revealing in the first two lines of the introduction by Ian Pindar and Paul Sutton, of Samuel Beckett's *Endgame*, where Hamm exclaims: "Nature has forgotten us" and Clove replies: "there is no more nature." [3]

In analyzing Esparza's device, we realize that it is a conjunction of nature and machine living together, a proposal for new ecosystems and symbiosis of nature and culture, art and science, and last, the creation and destruction as one of the conditions of nature but nowadays most importantly with ecological balance. In that sense, Guattari argues:

"The earth is undergoing a period of intense techno-scientific transformations. If no remedy is found, the ecological disequilibrium this has generated will ultimately threaten the continuation of life on the planet's surface. Alongside these upheavals, human mode of life, both individual and collective, are progressively deteriorating. Kinship networks tend to be reduced to a bare minimum; domestic life is being poisoned by the gangrene of mass-media consumption; family and married life are frequently 'ossified' by a sort of standardization reduced to their meanest expression….. It is the relationship between subjectivity and exteriority –be is social, animal, vegetable or Cosmic–that is compromised in this way, in a sort of general movement of implosion and regressive infantalization. Otherness [l'altérité] tends to lose all its asperità." [4]

The symbiosis of robot, plants and microscopic organism may therefore appeal to opposites, the Apollonian and Dionysian concepts in the *Birth of Tragedy*, [5] where the author argues that "Man is no longer an artist, he has become a work of art; man himself now moves with the same ecstasy and sublimity with which, in dream, he once saw the gods talk" and in this case we may say that it is not man who became a work of art but a fusion of nature and machine creating new organisms. *Plantas Nómadas* is a piece where ethics became an unquestionable component of the artwork itself and more than an aesthetical constituent to what art pleaded long time back. Here the artwork is closely connected with scientific thinking rather than with gestural process of painting or sculpting characteristic of traditional art. Postmodern times have favored the development of new expressive forms concerned with the earth itself distancing at the same time from the inaction of the land art in the sense that it uses its components by transforming it, but does not questioning the human effects on the earth.

The natural and the technological

Nowadays the scandals centered in some religious institutions concerning material wealth and libertine morals of the leaders, make it possible for a nihilistic society to flourish, a society closer to nature's demands and its protection. Technology became important to contemporary knowledge only through the mediation of a generalized spirit of performativity. Even today, progress in knowledge is not totally subordinated to technological investment as Lyotard, claims. In many art works produced nowadays, some artists need the newest discoveries and inventions produced in science to achieve their ideas, while scientists are more open to intuitive thinking that had characterized the arts. In *Plantas Nómadas* both processes go hand in hand, looking for an equilibrium that keeps both the mechanism and the organic system in symbiosis while producing an artistic experience. The goal in the artist's mind is to keep the machine working through the recycling of served water and the bacteria contained in it. The mimesis of nature, for instance, is emphasized with the sound produced by the robot when it has excess of energy -- it becomes a kind of animal in its aspiration to reproduce itself. *Plantas Nómadas* the sound may have as its goal to spread the benefits of the robot on a wounded earth. A question arises, Is it possible to envisage and build an autonomous community of robots that could reproduce themselves? Deleuze' concerns about the reproduction of machines was as follows:

"It is said that machines do not reproduce themselves, or that they only reproduce themselves through the intermediary of man, but "does anyone say that the red clover has not reproductive system because the bumble bee (and the bumble bee only) must aid and abet it before it can reproduce? No one. The bumble bee is a part of the reproductive system of the clover. Each one of ourselves has sprung form minute animalcules whose entity was entirely distinct form our own…These creates are part of our reproductive system; then why not we part of that of the machines?" [6]

Deleuze's question is fundamental on metaphysical issues. An approximation was made some time back with hybrids between human and machine approached in creative writing such as Mary Shelley's novel *Frankenstein* or analysis like the *Cyborg Manifesto* of Donna Haraway.

Esparza's work is promoting an interdisciplinary study of ecological perspective in a profound scientific engagement. The interstitial piece is on one hand mimicking amphibians, living partly in aquatic sediments and soil, while there is also another concern for land involving the process of restoring nature after being abused, by the seven thousand millions of humans inhabiting its surface.

Plantas Nómadas show us that through the exploration of the intersections of art and science many imaginable worlds can be reached, by originality, producing a state of fascination and enchantment. Paul Virilio quoted the architect Kasuo Shinohara who claimed that "the city of the future will express the beauty of confusion" to what Virilio reacted: "I am, on the other hand, quite convinced that it will in the near future illustrate the tragedy of the fusion of 'biological' and the 'technological.'" [7]

Here the artist is not far from what Virilio fortell. It is also important to mention the recent work of the Brazilian-American bio-artist Eduardo Kacs with his project *Natural History of the Enigma* that consisted of the hybridization of his DNA and a petunia plant (The *Edunia*).

In Esparza's work, the green plant is provided with a locomotive system that at the same time is ignited with clean energies, solar and micro biotic combustion cells. A previous work of his used a similar principle of solar photocell, though it was far more simple and tremendously poetic, the artwork was produced in 2008 and was named *Perejil buscando al sol* (Parsley looking for the sun).

The idea in Perejil buscando al sol as much as in *Plantas Nómadas* is that the artist in a way is altering the evolution of the plant by adapting a locomotion system in the first case, and locomotion and nutrients to a symbiotic system in the second.

An article of Victoria Gill, that appeared in the BBC news, affirmed that "plants can think and remember, based on the founds of the scientist Karpinski Stanislaw (2010), chemical signals could be passed throughout whole plants - allowing them to respond to and survive changes and stresses in their environment, included in his study was a discovery that when light stimulated a chemical reaction in one leaf cell, this caused a "cascade" of events and that this was immediately signaled to the rest of the plant via a specific type of cell called a "bundle sheath cell." [8]

From this perspective, the apparent symbiosis of the plant and the machine, the artificial intelligence and the chemical signals of the plant complement each other. The machine becomes the perfect object, where the movements of the machine, like human gestures, or the locomotion of a turtle, are replicated in the piece, but the automata is just an object. As Baudrillard wrote:

"The strictly practical object acquires a social status: this is the case with the machine. At the opposite extreme, the pure object, devoid of any function or completely abstracted from its use, takes on a strictly subjective status: it becomes part of a collection." [9]

The piece may look like an animal-machine or a toy, but it is not. Its complexity goes further because it is an art piece and falls into a new classification called *Device Art*, We quote:

"What we call device art is a form of media art that integrates art and technology as well as design, entertainment, and popular culture. *Device Art* is a concept that pushes the boundaries of media art and inherits the legacy of the experiments artists have been conducting with media technologies. By raising questions regarding possible relationships between art and technology, the role of hardware-based devices, and the borders between art and its related fields, and creating a common ground for artists and engineers to work together as equals, we might find some answers with regard to future directions rather than the past." [10]

In a sense, the robot reflects the spirit of his creator, it is the perfect mirror or pet, the object is the perfect domestic animal. It is the only 'being' with such qualities that exalts my personality instead of restrained. [11]

Baudrillard compared the robot to a mirror because the robot does not produce real images but only desired ones; it assumes the image of the perfect domestic animal because it highlights the character of its owner. *Plantas Nómadas* incarnates the myth of functionality, where its efficiency is in direct relation with the amount of nutrients contained in the water and the sun that hits the photocells. The robot, as Baudrillard makes a case, [12] is a symbol of a completely functionalized and personalized world that at the same time embodies the abstract power of men *in extremes* and without plunging into identification.

Conclusions

Esparza's robots draw attention to our relations with the environment allowing us to see the fragility of the machine, like nature, that at some point will stop running, perhaps destroyed, or become a part of the museum cemetery.

The creation of Esparza's piece questions the human excesses in consumerism, wastefulness and the lack of control of the public administration to handle the problem of the residues produced.

References and Notes:

1. T. R. Malthus, *An Essay on the Principle of Population* (London: J. Johnson, 1798), Electronic Scholarly Publishing Project, http://www.esp.org/books/malthus/population/malthus.pdf (accessed December 18, 2010).
2. E. O. Wilson, *Consilience: The Unity of Knowledge* (New York: Vintage, 1999).
3. F. Guattari, *The Three Ecologies* (New York: Continuum, 2005), 1.
4. Ibid., 27.
5. F. Nietzsche, *The Birth of Tragedy and Other Writings* (New York: Cambridge University Press. 1999) 121.
6. G. Deleuze, and F. Guattari, *Anti-oedipus: Capitalism and Schizophrenia* (Minneapolis, MA: University of Minnesota Press, 2000), 284-285.
7. P. Virilio, *Open Sky* (London: Verso, 2000), 57.
8. V. Gill, "Plants Can 'Think and Remember,'" BBC News, July 12, 2010, http://www.bbc.co.uk/news/10598926 (accessed July 12, 2010).
9. J. Baudrillard, *The System of Objects* (London: Verso, 2005), 82, 101-102, 138.
10. M. Kusahara, "Device Art: A New Form of Media Art from a Japanese Perspective," *Journal Intelligent Agent* 6, no. 2 (2002), http://www.intelligentagent.com/archive/ia6_2_pacificrim_kusahara_deviceart.pdf (accessed January 7, 2011).
11. J. Baudrillard, *The System of Objects* (London: Verso, 2005), 102.
12. Ibid., 101-102.

[I-METRO] UNIVERSAL ACCESS TO INFORMATION

Therese Tierney

This locative media project takes the position that information, as both a resource and an integral component of the public sphere, should be equally available to all. In response, the URL: Urban Research Lab at the University of Illinois Urbana Champaign designed [i-metro], an interactive information portal to be situated within metro stations, providing locative and comprehensive travel-related information in realtime.

Locative media installations such as this could become an important feature of public transit spaces accessible to multiple users simultaneously. © Tierney.

Introduction

Navigating through an unfamiliar city and gaining access to its many services presents challenges for visitors and new residents alike. As more location-based information moves online, however, mobile communication devices are becoming increasingly important as wayfinding tools. Yet, while such devices (e.g., blackberries, i-phones, droids, and in-dash GPS systems) provide instant access to maps and directories, their price and monthly service fees are frequently prohibitive. Thus, while many urban residents own cellphones, a lack of mobile Internet access may create a tiered system of information privilege. This condition may be particularly acute among those who rely on public transportation, such as job seekers, tourists, low-wage workers, and students. To live without a car in a major American city is often to live without full awareness of one's options and possibilities, limited by unnecessary wayfinding challenges.

For the last two years, URL: the Urban Research Lab at the University of Illinois, Urbana-Champaign, has worked to address this problem through the design of a public interactive information portal, "i-metro." Beta testing is expected in Los Angeles transit stations in 2012 (Fig.1). URL's i-metro project envisions a series of installations whose engaging physical design will combine with interactive features to make

them vastly more useful and empowering than old-line transit maps. Through i-metro, transit riders will be able to freely access GPS and other Internet-based applications, assisting them with wayfinding and emergency communication, while offering access to service directories and providing broad-based messaging capabilities. [1]

Theory and Background

With the expansion of computing and ambient intelligence into many aspects of everyday social life, it has become critical to reexamine the potential and objectives of locative media. This effort has sparked discussion of the contemporary urban condition and how people interact with it.

Over the last decade the increasing power of Information Communication Technologies (ICT) has opened the traditional concept of locative media (printed maps) to new dimensions of interactivity. Yet, whether interactive or old-school, a map remains a representational system; never socially inert, it operates as a stand-in for the city, describing how a particular social group imagines it to be. Since a map is thus both interpretive and productive, it prefigures user experience by structuring a navigational regime.

As a model of Lacan's social imaginary, a map engenders a larger set of questions about how people visualize a city. What do we want our cities to be? How can we employ representational systems and strategies to further those objectives? How might a networked organization dissolve certain barriers and strengthen others? Moreover, if we acknowledge that participatory practices are an integral and important aspect of location-based media, it stands to reason that "scribbling on the map" might actually change the territory. [2]

Since cartographic methods derive their conceptual underpinnings from both spatial and urban theory, the design of locative media is more than a technical problem. Considering the spread of ICT, it also follows that contemporary planners and analysts might focus less on physical boundaries than on shared resources and informational linkages.

Melvin Webber, an urban planner at UC Berkeley in the 1960s, once argued that "the urbane" might be defined less by buildings than by a rich exchange of information; he described communities of people joined by affinities, not by physical proximity. [3] Such a notion of informationally connected communities is compelling, but it fails to address many realities of urban life as they developed in the latter part of twentieth century. For example, the social theorist David Harvey has noted how, during the 1970s, market forces, expressed through new means of accumulation and distribution, began to pressure the historical city, reshaping its borders and diffusing its boundaries. [4] One result was the diminution of public space. Today, however, the adoption of universally accessible locative media suggests the possibility of reembedding the public sphere into a broader or different set of institutions.

A key aspect of URL's work is concern for the public realm — in particular, leveraging existing technologies to create more equitable systems of urban infrastructure. In this regard, the i-metro project is positioned within Kevin Lynch's notion of "The Image of the City," emphasizing the establishment of clearly legible urban environments to facilitate the inclusion of all residents. [5] Lynch wrote in the 1960s, a time when many ideas related to the establishment of socially just societies derived from a discourse of "spatial practice." More recently, the urban sociologist Manuel Castells observed how cities may be better understood as cultural networks. [6] With this in mind, the architect Carlo Ratti of the MIT Media Lab has since called for the establishment of an "Open Source City" based

on collaboration and knowledge sharing. [7] As Malcolm McCollough has further observed, "The notion of a commons . . . has moved beyond the desktop into many more formats and physical contexts, demanding new approaches to shared resources. The genre of 'urban computing' has arisen to explore this. How might the architectures of ambient information enrich urban experience, operate architectures, cultivate environmental sensibilities, or renew responsibility to some idea of a commons?" [8]

I-metro takes up McCollough's challenge by reviving the notion of a commons, working to strengthen information access as an element of the public domain.

Research

I-metro envisions a socially just and civil society, in which information, as a resource, is available to all. Current ICT product development, however, is increasingly oriented toward individualized and hierarchically structured access through personal mobile devices, generically known as smart phones. A working hypothesis for our research therefore was that, while the vast majority of a city's residents own cellphones, the increased power of information acquisition that comes with them does not extend equally across all income levels.

To test this hypothesis and evaluate possible design responses, our research was divided into three parts. In one part, graduate students sought to determine the potential utility of permanent installations for location-based information services within the space of public transit. They traced the historical emergence of ICT as it related to physical mobility from the 1990s to the present, including issues of social equity, accessibility, interactive technology, and the development of participatory media practices. Another part of the research involved review of ethnographic studies concerning the use of public space by the social geographer Claire Cooper Marcus, as well as a literature review of recent sociological work on transit use in urban areas. A third part entailed collection and analysis of demographic data, primarily from the U.S. Census and government surveys, to determine possible correlations between public transit use and lack of access to digital technologies, specifically mobile Internet.

The statistical analysis pointed to just such a correlation between demographic factors, income, and accessibility. For example, 80 percent of smart-phone users earn more than $50 thousand per year, while 34 percent earn more than $100 thousand, reinforcing an already existing digital, economic, and social divide. [9] Such data can be seen to intersect with findings from the report "Public Transit in America: Results from the 2006-2011 National Household Travel Survey," which revealed how strong differences in "household" and "workplace access to transit" are a function of race, income, auto ownership, and urban area size. [10] In general, low vehicle availability predicts high public transit use within the following groups: college students; newly employed 21 to 32 year olds; recent residents; under-represented women; older adults; non-national tourists; and other under-represented groups.

Not surprisingly, some of these groups also have less access to digital technology through computers, the Internet, and smart phones — a phenomenon that has come to be known as the "digital divide." The term refers to the gap between people with effective access to digital and information technology and people with very limited or no access, both in physical and economic terms and in terms of the knowledge and skills to use it. The gap reflects such characteristics as gender, income, race, ethnicity, and location, and is part of a broader divide contributing to social and economic exclusion.

While the digital divide is traditionally defined in terms of access to computers and the Internet, the Census also points to a correlation between income level, education, public transit use, and lack of access to digital technologies. In this case, the missing link is mobile wireless Internet. While smart phones can provide travelers with maps, directions, and information about local services, their cost may effectively create zones of information privilege. Free information portals located within public transit hubs would serve as an educational and wayfinding resource, contributing to a more livable and accessible city.

Project Description

Historically, communication and transportation infrastructures have been strategically paired. For example, the Southern Pacific Railroad built its own communication system using its rights of way, which later evolved to become the telecommunications giant Sprint. Within urban areas metro stations and other enclosed transit hubs are strategic locations to introduce such a public wireless infrastructure because they present fewer problems related to security, weather, and maintenance. Unlike a bus stop, a metro or subway station is an enclosed, supervised space, frequented by great numbers of people.

To attract people's attention, our design envisions a crumpled analogue subway map approximately 6.5 ft. high by 7 ft. wide. Each unique installation would be generated from its specific context, with the overall goal of enticing travelers to examine them and discover the wealth of information they provide.

In functional terms, the i-metro interface will provide a hybrid data input system: a touchscreen surface for primary information retrieval similar to a smart-phone screen, and a motion-detecting sensor to record the user's position in two directions relative to the interacting surface. The surface will also be partitioned graphically to accommodate multiple, simultaneous users, enabling them to share information with each other on-site as well as with others through the Internet.

To enable smooth connections between different modes of transportation, i-metro will provide comprehensive travel information in real time. But the world of digital maps is far more interactive and powerful than can be understood through analogies to printed resources. Additional services such as Google maps, foursquare, Goby, and AroundMe produce another city — one of layered opportunities and data, access to which is most useful when people are on the go. Transit riders might thus query i-metro not only about nearby bus routes and schedules but about the local availability of zipcars and citybikes. Or they might make hotel reservations, purchase event tickets, or find an inexpensive sushi bar.

With its fixed central location, transit riders might also use the interactive map as a messaging board, a digital version of LOck in Seoul or Juliet's Wall in Verona. It might further encompass a gamelike structure, enabling the user to explore, participate, and play, as well as connect with others.

The combination of participatory with locative media will enable i-metro to make visible the connections between individuals and the cultural resources of surrounding neighborhoods. Through social media a neighborhood becomes a location-based network with nodes for eating, drinking, clubbing, dog-walking, etc. Such a locative social network was established on a temporary basis at the 2011 SXSW festival in Austin, Texas. Through i-metro, user-generated content such as narratives and images might not only situate each individual but also acknowledge common interests among transit riders and urban residents, binding them into a greater whole.

Design Process

As part of i-metro's design, demographic data was used to create various scenarios to determine the information that might be most useful to incorporate. During scenario planning, one objective was to establish the personal identity as the anchor in the map. Using the i-metro interface, each user should be able to "find" his- or herself in e-space as well as participate in the construction of a local resource map by uploading content and feedback. Thus the map would change over time, creating a metacommentary on the surrounding environment.

Scenario One: Student Study Group. How an interactive locative messaging board could be used to connect people between e-space and street-space.

In New York, John is extremely stressed. With an exam coming up, he needs to find a place to study because there are too many distractions at home. Judy is on the other side of town, looking for a classmate to study with. On the way to his local coffee shop, John uses twitter on his cellphone to check in/announce his plans. Meanwhile, at her subway stop, Judy runs into another classmate, Jeff, and they decide to study together. While Jeff looks for a coffee shop on i-metro, Judy casually notices on its foursquare feed that John is already on his way to one. Judy shares the message with Jeff by swiping onto his screen. She then texts John to ask if it's okay for them to join him. John, cellphone in hand, notices Judy's request and texts her the address. Judy and Jeff then use i-metro's mapping capabilities to figure out the best way to get there, using its directories of bus schedules, zipcar drop-off points, and subway routes. Judy and Jeff decide the cheapest way is by subway. Boarding the next train, they head off to join him.

Scenario Two: Lost Tourist. How two people with different languages might access wayfinding information, and in the process discover a shared interest and possible unplanned destination.

In Chicago an international tourist is lost; she did not apply for global cellphone service before coming to the U.S. Now, not only does she not speak much English but her smart phone does not work. A native Chicagoan passing by assists her. During translation efforts using the i-metro interface, the two serendipitously discover they have similar interests — baseball, anime comic books, and obscure hip-hop vinyl. The resident places a location tag and uploads comments onto the map, so they will be stored there for future like-minded tourists.

Scenario Three: Vehicle-less Job Seeker. How a job seeker might avoid an embarrassing mistake that might make him late for his appointment.

On route to a job interview, a new Los Angeles resident remembers he forgot to ask directions to the company headquarters. Although he owns a conventional cellphone, he does not wish to call the prospective employer and admit his mistake. Instead, he heads back to the subway station and queries i-metro by entering the business address on its touch screen. The map graphically displays the route and concurrently sends a text to his cellphone with directions. Happy job seeker is on his way!

Conclusion

The project began with the hypothesis that the acquisition and use of smart-phone technology is creating zones of information privilege that exclude many public transit riders. This aspect of the

"digital divide" will become ever more problematic as more locative information moves online. As a design response, i-metro proposes to subvert the inherited navigational regime by offering an interactive, layered method of wayfinding, enabling the user to explore and consider multiple opportunities.

As an urban intervention, i-metro demonstrates how design research might be applied to observe, document, and analyze the embedded politics of unequal information access within a prescribed context and go beyond those constraints to develop a more egalitarian means of information distribution. According to the late William Mitchell: "The task before us is not one of prioritizing technological solutions over human solutions, but rather one of imagining and creating digitally mediated environments for the kind of lives we want to lead and the sorts of communities we want to have." [11]

ACKNOWLEDGEMENTS

References and Notes:

1. *URL projects have investigated systems as they pertain to infrastructure, software, ecologies, and environments. As director of these efforts, I collaborated with Vincent Velasco, Master of Architecture candidate.*
2. *LessWrong Wiki Web Site, "Lesswrong," March, 2010, http://wiki.lesswrong.com/wiki/The_map_is_not_the_territory (accessed June 15, 2011).*
3. *Melvin Webber, "The Urban Place and the Non-Place Urban Realm," in Explorations into Urban Structure, ed. Webber et al. (Philadelphia, PA: University of Pennsylvania Press, 1964).*
4. *David Harvey, The Condition of Postmodernity (Hoboken, NJ: Wiley-Blackwell, 1991).*
5. *Kevin Lynch, The Image of the City (Cambridge, MA: MIT Press, 1960).*
6. *Manuel Castells, The Rise of the Network Society (Malden, MA: Blackwell Publishers, 2000), 1-76.*
7. *Carlo Ratti, "Open Source Architecture Manifesto," in Domus, no. 948 (2011).*
8. *Malcolm McCollough, "Situated Technologies Too" (lecture at the University of Illinois, Chicago, October 1, 2010).*
9. *The Neilsen Company, "Mobile Phone Use," The Nielsen Company offical Web Site, 2010, http://en-us.nielsen.com/content/nielsen/en_us/industries/media.html (accessed November 25, 2010).*
10. *National Household Travel Survey: Demographics of Daily Travel - 2006-10(Ithaca, NY: New Strategist Publications, 2010).*
11. *William Mitchell, City of Bits (Cambridge, MA: MIT Press, 1996).*

THE NATURE OF (IN) PERFECTION

Kevin Todd

While digital technology can be considered postmodern and progressive from a technological viewpoint, it nevertheless raises issues that have a longer history evident in art and science and an awareness of these can help our understanding and engagement with the technology/medium.

The prefix post (as in postmodern) can sometimes suggest the redundancy of ideas that are surprisingly persistent despite the aesthetic changes that come with the new ideology/technology. Looks can be deceiving!

Precision, perfection and beauty have a persistent presence in art, science and religion and a contemporary presence in digital technology, which *carries* these attributes/attitudes. Although the desire for and promise of progress can lead to image content that appears to supersede the preceding idiom, digital technology has a metaphysical character that has more in common with a pre-modern sensibility.

Another characteristic of digital technology is the extent to which the supposed separation of physical form and content actually masks its inherent qualities. Global communication suggests a transcendence of analogue imaging media such as photography and there is a sense that digital images are *free* or have gone *beyond* the physical limitations of older media. A photograph has intrinsic visual qualities inherent in the medium whereas a digital image does not; it can appear like it wants, even masquerade as a photograph. Measured against the standards of older media digital media can be thought of as trans-media.

However, digital media do have qualities inherent in the technology, although these only become visible if the operator/artist chooses to acknowledge them. Digitisation primarily involves the management and manipulation of data, underpinned by rationalism, precision and a relationship to space. The organizing principle of digitisation is mathematical and the *appearance* or pictorial content of the image is of no consequence to it. Like science, the *method* can be divorced from the outcome and the medium is indifferent to the consequences of image content. Mathematics like science can imply objectivity, lead to a sense of detachment and the loss of responsibility that comes with this. There is an aesthetic *and* ethical quality to the rationalisation inherent in digitisation and the difference between the aesthetic character of the medium/technology and the aesthetic relating to form/content of the image is therefore a significant quality of digital media. Umberto Eco addresses the "aesthetics of number" in his book *Art and Beauty in the Middle Ages*;

".....since number, or order or proportion, is as much ontological as it is ethical and aesthetic. Aesthetic qualities predominate if one adopts a contemplative perspective on something, rather than an active role." [1]

There is a case then for an active engagement with digital media, one that does not accept that technological progress involves the redundancy of older ideas and media; a refusal to be duped by the prefix "post". This engagement needs to explore digital media through an acknowledgement that, like science it has a longer history and can't be neatly quarantined from an imperfect past.

Margaret Boden identifies three types of creativity in her book *Creativity and Art: Three Roads to Surprise* "each distinguished by the types of psychological process that are involved in generating the new idea." [2] These are;

- Combinational - unfamiliar combinations of familiar ideas.
- Exploratory - exploring (existing) conceptual spaces.
- Transformational - transforming the space.

We generally think for digital media in the transformational context and this fits with Boden's hypothesis where the new media has "impossibilist" characteristics in relation to the preceding media but "with both structural continuities and structural discontinuities between the transformed space and the impossible successor." [3]

Transformational creativity is seen as progressive and there is often an emphasis on this when we teach art history. The transformation from representational to more abstract art that occurred in the later part of the 19th and early 20th century is a good example as is the development of perspective during the Renaissance. An important point in both these instances is that although paintings may have *looked* radically different the actual medium itself didn't change, allowing the transformation to be easily positioned in an art historical context. However, Paul Crowther in his paper *Ontology and Aesthetics of Digital Art* suggests that traditional idioms had reached their limits at a formal or structural level in terms of the semantics of likeness and the spatial coherence of space such as through perspective;

  "The exhaustion of large-scale artistic innovation is due, rather, to the fact that the *structural* conventions and properties that constitute pictorial representation are unable to sustain further significant development at the structural level itself.*"* [4]

Although he acknowledges that abstract art offered new possibilities he suggests that it too has been "exhaustively developed in structural terms." [5] Crowther places an emphasis on the structural/formal innovation of media as opposed to the pictorial content and its connection to the individual artist. There is a danger here that technological innovation becomes the primary factor in the artistic relevance of work created with digital media and its attitude toward the "exhausted" work of the past. Digital media involve a transformation of both medium (technology) and content but I would suggest that there are also exploratory and combinational aspects in relation to other media and art history in general. The extent of the transformation may not be as radical as we think.

Perhaps the most significant and comparable transformative medium prior to digitisation was the development of photography where technology and image also combined. Indeed it has been suggested that photography's emphasis on representation was a contributing factor in the development of abstract art and photographic representation is still considered the "standard" means of depicting the world; so much so that digital media sometimes mimic this. Interestingly, there were stylistic similarities between early photographs and paintings, particularly in the poses for photographic portraiture where long exposures were possibly a factor. Photography too was initially seen as primarily a technical achievement, although the technology needs to be positioned in the context of the desire for a particular type of picture, that; "….was not a bastard left by science on the doorstep of art, but a legitimate child of the Western pictorial tradition." [6]

The archaeology of photography has been explored where the development of the medium is considered in the historical context of for example, the camera (camera obscura), optics, chemical processes, industrialisation and the psychology/history of pictorial representation. If photography was the defining medium of the modern then the characteristics of digital media can be considered definitive of the post-modern. In this context we could consider digital media as the development of the *contained* image and a relationship to light - a history of the image in a box, including; the camera obscura, photographic camera, television and computer. Yet there is a sense in which digital media are thought to have superceded history and Erkki Huhtamo and Jussi Parikka address this in the introduction to their recent book on media archaeology.

"……..studies of new media often share a disregard for the past. The challenges posed by contemporary media culture are complex, but the past has been considered to have little to contribute toward their untangling. The new media have been treated as an all-encompassing and "timeless" realm that can be explained from within……..The past has been visited for facts… but .. their relationship to the observer and the temporal and ideological platform he or she occupies left unproblematized." [7]

Perhaps the most profound claims made in relation to digital media concern the materiality of information, the relationship to space and to the human body. At a basic level digitization is considered as a type of casting-off of the physical in that the number (code) involved is presented as if it were a concept, an idea. This dematerialized information can then be communicated independent of its physical carrier (its materiality) thus reconfiguring a relationship to space and time. In addition, the lack of perceived physicality allows for plasticity in relation to content and any media specific mode/style of representation. This desire to transcend the physical might have a religious impulse as Margaret Wertheim writes;

"Here, contemporary dreams of cyberspace parallel the age-old Platonic desire to escape from the "cloddishness" of the body into a "transcendent" realm of disembodied perfection –the realm of the soul. Western culture carries this seed deep within it, inherited both from the Greeks and Judeo-Christianity." [8]

However, just as an idea requires embodiment in the human body or in an artefact in order to exist and be communicated (notwithstanding Plato's ideal forms), digital information requires a technological apparatus in order to exist. The basic element of digitisation is the expression of code electronically – the control and manipulation of electricity in the creation of light on a screen to display image or text. Computer code evolved as a means of *performing* electronically and the code is active because it relies on electricity to execute itself. The astounding achievement of digital media is in the precision/perfection required to actively control the billions of electrical signals needed to generate information/images.

We could also consider digital media in the context of the psychology of content, both in terms of the individual user/creator and in a collective sense. Indeed it has been suggested that cyberspace and the internet are a manifestation of our collective subconscious, complete with archetypes and gods - Mark Stefik explores this in the book, *Internet Dreams: Archetypes, Myths and Metaphors*. However, we can also consider the creation of the technology itself as a reflection of a collective culture or psychology, particularly now that the intrinsic (analogue) link between medium and message, between physical form and content has been broken for the sake of manipulation. Does precision stem from the desire for perfection and the feeling that we can/must escape the physical and might this attitude have a history that would better help us to understand digital media? Also, would this approach help position digital art in a broader historical context and more importantly, would it relieve digital artists of the pressure and iso-

lation of working in an "all-encompassing and timeless realm that can be explained from within." An interesting point here is the extent to which the quality of work produced by my undergraduate students has not "improved" over the past ten or fifteen years despite the significant improvement in the performance of the technology they are using. Their artwork isn't any "better" despite the increased sophistication of the tool and I wonder if technological development places a pressure on the art/artist to also be transformative.

The computer code underpinning digitisation is actually the means by which we interact with the machines we build to control. This code needs to be rational and unambiguous and all inputs or content needs to be expressed in a mathematical/electrical form in order to be processed. Because there are no intrinsic visual characteristics to this reduction the machine/process is ambivalent about the image content. Digitisation intervenes in the relationship between the image and the object and it breaks the connection between images and objects such as exists with photography, where the medium receives and accepts something external to its self. This breaking of representation in the image-object relationship is significant in that the visual integrity of the source (the object) and its part in a dialogue with a component of an external (fixed?) reality is preplaced by the monologue of the virtual in the man-made machine. There is a kind of *turning away* from the external, from the representation of a fixed reality; a turning to the screen. The passive objectivity of the camera is replaced by the active and subjective character of the computer-based image, which is readily available for manipulation.

There is an interesting correlation here with debates regarding images prior to the Enlightenment when intromission and extramission were competing theories for the source of meaning. David C. Lindberg discusses this at length in his book, *Theories of Vision: from Al-Kindi to Kepler* where he explores vision, optics and light. In broad terms intromission accepted that images were external and received by the viewer whereas extramission involved the subject projecting light in order to produce the image. Although proponents of the theories did not approach the problem in the context of our current understanding of psychology, nevertheless there is a correlation between meaning that is fixed and external and that which is subjective and generated by the viewer. Images and light are problematic because we conceive of them as somehow being on the border of the physical/non-physical interface; metaphysical mediators if you like. Lucretius pondered this problem in the first century B.C. when he conceived of films emanating from the object as physical entities.

"Finally, Lucretius (ca. 55 B.C.) attempts to clarify the nature of the films (which he calls simularcra) coming from the visual object, through several comparisons: "among visible things many throw off bodies, sometimes loosely diffused abroad, as wood throws off smoke and fire heat..".. Vision, then, is reduced to a species of touch ...If this intromission theory leaves many unanswered questions...it nevertheless answers the principal question: namely, the soul of the observer and the visible object make contact." [9]

Because Lucretius was an atomist he believed that sensation must be caused by physical contact and that all matter consists of small particles called atoms, which can be considered analogous of the atoms later discovered by scientists. However, these atoms coalesce to "form coherent units-films or simularcra" [10] so that the film has an integrity/continuity without gaps between the atoms – much like comparing the continuity of a photograph with the pixilation of a digital image. However, the photographic image is connected with optics and perspective and indeed the "laws" of perspective apply to photographs because the light rays from the object pass through a single point in the lens. Both photogra-

phy and perspective presuppose that light rays, travelling in straight lines connect the image and the object or the eye and the object. This presupposes a world of multiple point sources, a concept that mathematically fragments coherence. Lindberg addresses this;

 "...before Alhazen, the intromission theory *was* the theory of coherent images or forms. Alhazen was the first to utilize the analysis of the visible object into point sources, each of which sent forth its ray, as the basis of an intromission theory of vision. If such a step seems trivial today, that is because we are Alhazen's intellectual progeny." [11]

This concept of fragmenting the world into multiple geometric points involves a similar attitude to its fragmentation into multiple pixels for digitisation. Both seek to establish a reductive mathematical relationship based on rational data and although the digital data results from this process, its performative character and plasticity in relation to image content allows it to mask its rationalism. Digital media maintain their technical/rational character despite image content even when they seek to mimic other media such as painting for example. The benefit of this technical interaction with the world is control, a characteristic addressed by Michael Eldred in his paper *Digital Being, the Real Continuum, the Rational and the Irrational*;

 "The unique hallmark of specifically digital technology is that it is binarily encoded productive understanding of a segment of the world *outsourced* to an electromagnetic medium to control a machine." [12]

The segmentation of reality is further discussed by Eldred specifically in relation to the abstraction of time and he concludes that there is an ontological limit to the *calculation* of the continuum of reality; "Physical reality, even on a banal macroscopic level, therefore always exceeds what can be logically, mathematically, rationally calculated."[13] This *calculation* of reality has a long history, for example in the fifth century B.C. Philolaos stated that "All things that are known have a number: without number it would not be possible to know or think anything whatsoever." [14]

While we might conceive of an authentic reality (the original) and an inauthentic representation of it (the image), our experience of the image/technology is real and using a computer is *part of* reality even if we critique the ontology of the technology as somehow being a surrogate for our relationship to the world; the relationship between mind and nature.

Eldred states that there is no way to discuss digital being without reference to Heidegger and perhaps in this context it is worth considering Heidegger's three types of representation; "bodily presence", "empty intending" and the "perception of a picture". These categories presuppose an *original* object either actually present (bodily presence), dreamed/ imagined (empty intending) or physically depicted (perception of a picture). The sculptures of Greek gods referred to earlier do not fit easily into this classification as the original is imagined – we have "bodily presence" in the form of the actual sculpture of something that began as "empty intending". However, a photograph of the sculpture would involve "perception of a picture" of something with a "bodily presence" and we would be once-removed from the original "empty intending." But, what would a digital scan of the photograph be?

A digital image, which may be virtual or representative of something external to the computer, does not fit with a system that invests the original with authority in relation to meaning. A computer-generated fractal for example may have no physical correlation beyond the computer and the image on the screen

would thus involve "perception of a picture" of something that may have begun close to "empty intending" but needed the processing power of the computer to be realized as an image – an outsourcing of imagination perhaps!

However, the fractal image on the screen must have a "bodily presence" to be visible to another viewer; otherwise it would be "empty intending." Its "bodily presence" is something not intrinsically linked to the image as the millions of pixels or points of light can be reconfigured to represent anything. Perhaps this causes us to feel there is an inauthentic character to the digital image, but this would only be the case if we seek a link to something authentic (the original), whereas the digital image doesn't necessarily do this; it has a disregard for the original.

While digital technology can be considered postmodern and progressive from a technological viewpoint, it nevertheless raises issues that have a longer history and an awareness of these can help in our understanding and engagement with the technology/medium. To quote, Margaret Wertheim again from *The Medieval Return of Cyberspace*; "Through the medium of the computer a loophole has been found in the materialist metaphysics that has dominated Western culture for the past three centuries…" [15]

Perhaps I should leave the last word to Goethe who comments on reason and reality; "They were rational, clever, lively people who saw very well that the sum of our existence, divided by reason, never goes evenly, but always leaves the remainder of a queer fraction." [16] Of course Goethe means queer in the sense of odd or strange and my dictionary also lists queer as meaning; dubious, shady, giddy, slightly mad and counterfeit, which is possibly why I enjoy digital media so much!

References and Notes:

1. *Umberto Eco, Art and Beauty in the Middle Ages (New Haver, CT: Yale University Press, 1986), 30.*
2. *Margaret Boden, Creativity and Art: Three Roads to Surprise (Oxford: Oxford University Press, 2010), 73.*
3. *Ibid., 74.*
4. *Paul Crowther, "Ontology and Aesthetics of Digital Art," in The Journal of Aesthetics and Art Criticism 66, no. 2 (2008): 161.*
5. *Ibid., 191.*
6. *Peter Galassi, Before Photography: Painting and the Invention of the Photograph (New York: The Museum of Modern Art, 1981), 12.*
7. *Erkki Huhtamo and Jussi Parikka, "Introduction," in Media Archaeology: Approaches, Applications and Implications, ed. Erkki Huhtamo (Berkeley, CA: University of California Press, 2011), 1.*
8. *Margaret Wertheim, "The Medieval Return of Cyberspace," in The Virtual Dimension: Architecture, Representation, and Crash Culture, ed. John Beckman (New York: Princeton Architectural Press, 1998), 55.*
9. *David C Lindberg, Theories of Vision from Al-Kindi to Kepler (Chicago, IL: University of Chicago Press, 1976), 3.*
10. *Ibid., 58*
11. *Ibid., 60*
12. *Michael Eldred, "Digital Being, the Real Continuum, the Rational and the Irrational," Artefact. org, http://www.arte-fact.org/untpltcl/dgtlcntm.html (accessed June 9, 2011).*
13. *Ibid.*
14. *Umberto Eco, Art and Beauty in the Middle Ages (New Haver, CT: Yale University Press, 1986), 62.*
15. *Margaret Wertheim, "The Medieval Return of Cyberspace," in The Virtual Dimension: Architecture, Representation, and Crash Culture, ed. John Beckman (New York: Princeton Architectural Press, 1998), 47.*
16. *Quoted in Michael Eldred, "Digital Being, the Real Continuum, the Rational and the Irrational," Artefact.org, http://www.arte-fact.org/untpltcl/dgtlcntm.html (accessed June 9, 2011).*

CAPTURING GESTURES FOR EXPRESSIVE SOUND CONTROL

Todor Todoroff, Cécile Picard-Limpens, Julien Leroy & Alain Crevoisier

We present different tools that give musicians extended control for live performances. We developed at Numediart a wireless system of light wearable MARG sensors. We also developed tools to align the orientation of each performer's limb with the skeleton from the Microsoft Kinect camera. The Surface Editor is used to easily and intuitively map sensor data to OpenSoundControl or MIDI messages.
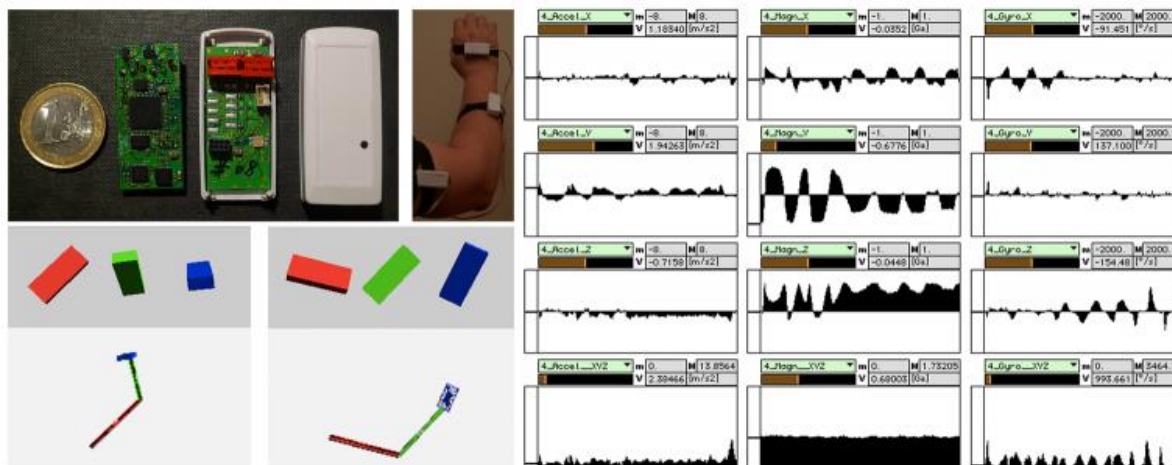
Fig 1. Top left: Sensor node, from left to right: 1 Euro coin, bottom, top PCB views and boxed, with hole for control LED; Bottom left: Attitude of the upper arm (red), lower arm (green) and hand (blue), and reconstructed skeleton in Jitter; Right: Max/MSP Display of the 3 axes of the accelerometer, magnetometer and gyroscope, with total amplitude.
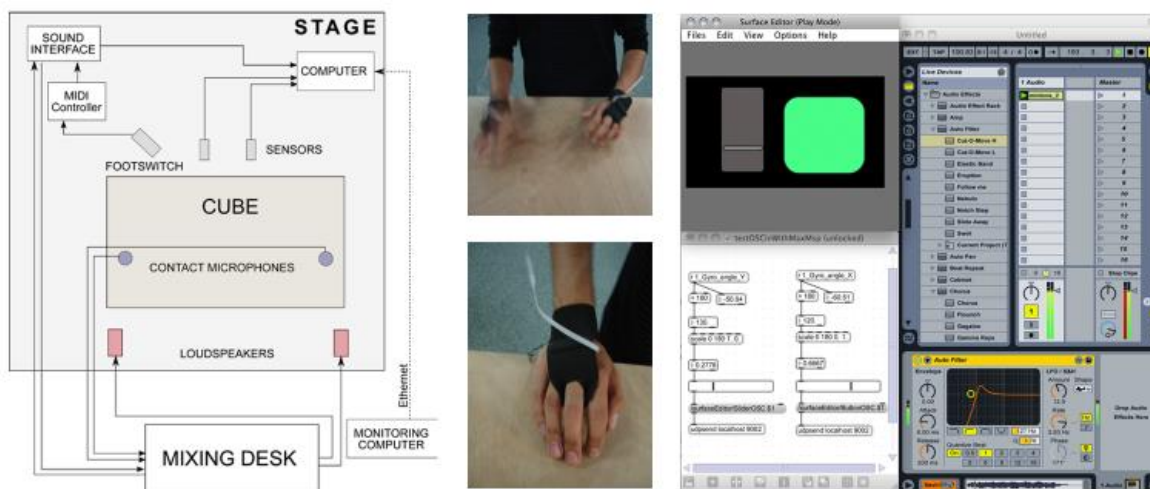
Fig 2. Left: Augmented percussion ("CUBE") with sensors: scheme of set-up; Center: The percussionist wears the sensors on its hands. Gestures orientation are mapped to specific sound modulation parameters; Right: Parameters of the device in Ableton Live applied on Track 1 are controlled by the sensors through the Surface Editor.
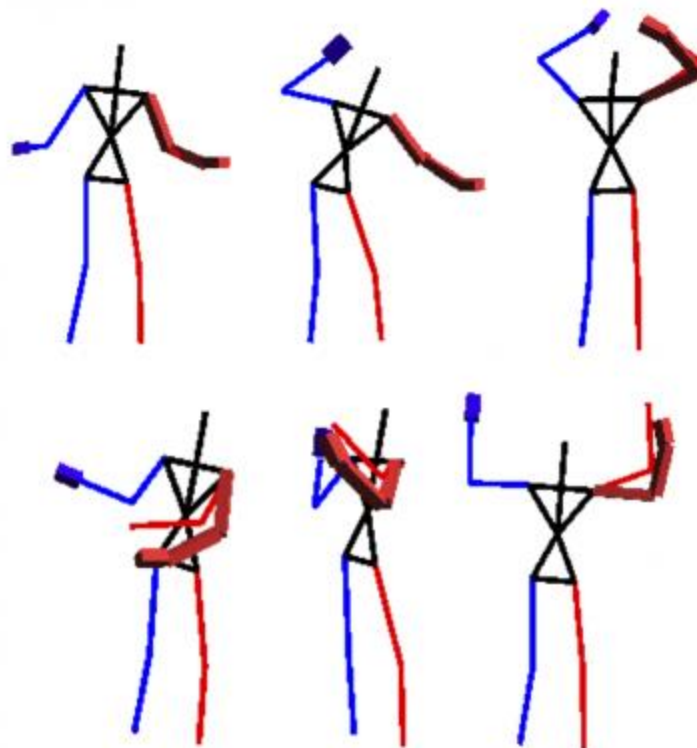
Fig 3. Fusion between the Kinect skeleton (thin lines) and the "sensor" limbs (left hand and right arm, solid bodies) in Jitter, aligned in top pictures, while bottom pictures show misalignments due to Kinect latency and its approximative evaluation of elbow and wrist positions.

1. Introduction - Musical Gestures and Interfaces

Musical communication between musicians and listeners, is based on movement: performers control instruments through body movements, which are encoded through audio, and finally analyzed by listeners [Godoy and Leman, 2009]. The concept of gesture, defined as "a movement of part of the body to express an idea or a meaning", and the extensive presentation of its relationships with sound in music have emerged [Godoy and Leman, 2009]. [Cadoz, 1988] proposes a classification of instrumental gestures depending on their function: excitation, modification and selection gestures. New technologies used for musical performance should therefore build meaningful combinations of sound and movement, in order not only to ensure coherence in the musical experience of the performer, but also to preserve the musical communication between musicians and listeners.
We focus here on the idea of "augmented instruments", i.e. acoustic instruments with additional technology capabilities [Miranda and Wanderley, 2006]. It relates to some of the Hyperinstrument projects (http://opera.media.mit.edu/projects.html) at MIT. We aim at extending musical playing techniques digitally in meaningful andintuitive ways while minimizing the performer's constraints. This approach relies heavily on technologies that are able to track the gestures of the performers.

We present in section 2 the MARG (Magnetic, Angular Rate and Gravity) sensors we developed at Numediart [Todoroff, 2011]. The attitude of each sensor can be computed, giving the orientation of each

performer's limb they are attached to. We developed tools to align those orientations with the skeleton obtained with the Microsoft Kinect camera (http://www.xbox.com). It becomes then possible to replace some limbs of the Kinect skeleton by faster and more accurate limbs computed from the sensor data, while keeping the absolute position of the torso given by the Kinect. Our gesture recognition algorithms [Bettens and Todoroff, 2009] show improved performances when used with orientations rather than raw sensor data. The first prototype of these Numediart sensors was used in 2010 in a project with a viola player who dances while playing the viola [Todoroff et al., 2011]. This on-going project explores gestures beyond the usual augmented instrument focus, like leg movements, as it aims to transform the whole body of the performer into a sound body, extending the traditional sound body of the acoustic instruments to the combination performer + instrument. In section 3, we describe the Surface Editor, a mapping tool originally developed to create control interfaces with a tactile surface. We used the Surface Editor for interfacing the sensor data to sound devices through MIDI or OSC (http://opensoundcontrol.org/) protocols. We finally present a project at HEM intended to focus on the percussionist's movements, and, in particular, those movements that do not directly produce sounds but are performed when preparing or exiting a sound producing gesture (section 4).

A well-formatted pdf version of this paper can be downloaded at http://www.numediart.org/files/capturing_gestures_for_expressive_sound_control.pdf

2. Tracking and recognizing gestures

2.1. Numediart sensors

We started in 2009 at Numediart the design of small wearable sensor nodes that include 3-axial accelerometers, gyroscopes and magnetometers. Our latest design, in 2010, offers 6 additional analog inputs to connect optional sensors (pressure, flexion, light, ...). The 17x38 mm circuit board fits into a tiny USB key plastic box and weights only 5 grams, box included. The nodes may be used as such with a wired USB interface, using a cheap serial to USB bridge. But they were designed to be connected, through a digital I2C Bus, to a dedicated Master node/WiFi transmitter that includes a LiPo battery and a charger in a small 70x55x18mm box, offering about 10 hours autonomy. Up to 8 sensors may be connected at 100Hz sampling rate. More details about the sensors specifications and the Master/Slave node architecture can be found in [Todoroff, 2011].

2.2. Software tools

Sensor data, received either as serial bytes over USB or as UDP packets over WiFi, is decoded by a custom-made Max external that outputs values in meaningful units: acceleration in g, rotational speed in deg/s and magnetic field in Gauss. These values can easily be mapped, within the Max/MSP environment, to sound attributes. And additional processing may be done to extract other features, like hit detection from the accelerometer data.
Having MARG sensors, we use the [Madgwick et al., 2010] method to compute the attitude in quaternions. Attitude is the absolute orientation in the 3D space defined by the earth gravity and magnetic fields. We offer the user a two step procedure: a calibration step, facing magnetic North, to compensate for sensors misalignments on the body, followed by a rotation around the vertical axis, to define the chosen direction for the performance. Quaternions can then be transformed to equivalent Euler sequences of rotations and those angles may be mapped to sound parameters.

If enough sensors are placed on a limb, quaternions can be used to animate a skeleton, giving the relative positions of joints. We may also easily compute the angle between any two given segments, like the angle of the elbow, a very useful feature to map to sound.

2.3. Fusing Numediart sensors and Kinect skeleton

Knowing its position, the Kinect from Microsoft (http://www.xbox.com) is able to reconstruct a 3D scene that provides an absolute reference to the real world. Our application, built on OpenNI libraries and drivers, detects users, tracks their skeleton, transforms camera-centered coordinates to stage-related coordinates, and sends the individual joint positions as OSC messages. The Kinect tracking lacks precision as some joints, like wrists or ankles, are not detected. The skeleton therefore doesn't provide individual segments for lower arm and hand, or lower leg and foot, but "virtual" segments that combine both.

Connecting limbs from our sensors to the Kinect skeleton, we keep the good absolute position of the torso and shoulders from the Kinect, as well as a useful approximation of limbs not equipped with sensors. And we track, with sensors, body parts (like hands or feet) or rotations of limbs around their own axis (like arm or wrist twists) that cannot be tracked with the Kinect. With their lower latency and higher 100Hz sampling frequency, sensors follow more accurately those body parts that, because of their lower inertia, are able to move faster. While accelerometer and gyroscope data may still be mapped directly to sound processes, independently of the attitude and skeleton.

2.4. Gesture recognition

We presented in [Bettens and Todoroff, 2009] a multigrid implementation of Dynamic Time Warping (DTW), adapted to sensor data and available as Max/MSP/Jitter (http://cycling74.com/products/maxmspjitter/) external objects and patches. It allowed to recognize gestures, from a user bank of pre-recorded reference gestures, without prior segmentation, i. e. on the fly, not knowing when a gesture starts or ends. We implemented new distance estimators directly from the quaternions defining the attitude in 3D space. It has many advantages over the estimation of distances from acceleration and gyroscopic data as we did previously:

- attitude does not depend on the speed of execution of a gesture, giving consistent distances at all speeds;
- the orientation in the horizontal plane allows better discrimination between similar gestures;
- as attitude data varies slower that raw data, the computation may be downsampled by a significant factor without loosing useful information, reducing the processing load by the same factor;
- distance estimation from attitude data is more efficient, as only one distance, between the reference and the incoming quaternions, needs to be computed;

We recorded for instance one reference gesture for each letter of the alphabet, using 3 sensors. We could then write a text by drawing each individual letters in the air, with a downsampling factor of 8, with hardly no false positives or negatives. We found this test conclusive, as discriminating all the letters of the alphabet is a more complex task than recognizing the reference gestures that would usually be defined for a musical performance.

3. Mapping Gesture Data to Sound Effects

The Surface Editor (http://www.surface-editor.net/) has been developed as a flexible mapping tool [Kellum and Crevoisier, 2009]. It enables users to create interfaces between inputs, e.g. gestures, and outputs, e.g. sound attributes, by configuring components (zones, buttons, sliders, etc.) and attaching actions to them. Those actions will be processed when specific user-defined conditions are met: for instance, an action attached to a slider can be triggered continuously or only when the slider value changes. Originally conceived for a tactile interface, the Surface Editor has been extended to support the input of any device sending OpenSoundControl (OSC) information. In that way, the Surface Editor is able to gather different input variables from external hardware controllers, such as sensors, in a coherent manner. In addition, it is possible for one controller to change the behavior of another one.

We set the communication from our sensors to Ableton Live (http://www.ableton.com/) using the Surface Editor. Signals from the sensors are sent from the Max/Msp environment via OSC as input parameters to the Surface Editor. The Surface Editor supports LiveOSC (http://liine.net/livecontrol/ableton-liveapi/liveosc/), allowing Ableton Live to inform it of all the available destinations: volume, clips (audio samples) and devices with all their parameters. The user can then map a sensor input action to the desired Live destination simply by selecting it from a dropdown menu. This greatly simplifies the mapping workflow.

4. Experiment with students at HEM

4.1. Approach

We distinguish between sound effects that concern the sound source and those that are related to the sound propagation. In the case of the percussion instrument, the attributes of the instrument (geometry, size and material), the position of the hit on the surface and the characteristics of the excitation strike (i.e., the 'rigidity' of the striking finger(s)) affect the sound production. For example, we can extend the sound production possibilities of the given musical instrument by applying an effect that simulates the acoustic characteristics of other resonant objects. This may be mainly done by acting on the frequencies, amplitudes and decay rates of the resonance modes of the instrument. On the other hand, the sound propagation is mainly depending on the acoustic environment, i.e., the space configuration and the potential secondary sources that affect the amount of reverberation. These elements are rather fixed during a 'classical' performance, but we can add sound effects that simulates a virtual acoustic space where sounds appear to originate from a specific direction in space.
The sensors allows to detect static data such as the angle of the hand in the three directions, but also dynamic data such as the amount of energy of a movement (deduced from the output of the accelerometer). These elements can be used as gesture attributes for mapping sound effects. Having a sensor on each hand can allow enabling/disabling one sound effect with one hand, whereas the other act on modulation parameters. Also, sound effects including several parameters can be better controlled by the use of two hands, such as the reverberation effect where the amount of delay and filtering can be treated separately. If we focus on the percussionist's movements, there are several gestures that do not directly produce sounds and can be used for sound modulation. When exiting a striking movement, the hand movement of the percussionist is progressively slowed down. This movement decrease can be easily used to modulate the amount of an effect. On the other hand, the preparing gesture, e.g., the impetus of a strike, can be handled to set a specific sound layer before the effective strike sound.

4.2. Performance

We collaborated with two students of the Haute Ecole de Musique de Genève (HEM), one in the composition class and the second in the percussion class, both with a contemporary music aesthetic. Our purpose was to provide a technology that can not only be easily integrated by the instrumentalist, but that also allows new trends and ways of composition. The development and configuration of this new musical tool was the result of a constant dialogue with the composer and the percussionist, providing an added musical dimension, straightforward for the composer and non-intrusive for the performer.

The sensors were attached to the hands of the percussionist in a way that doesn't hinder his movements, a very important factor for the performance. The composer defined specific ways to notate the new musical gestures in the score. The percussionist was not asked to perform unusual gestures. The composer focused instead on investigating percussionist's gestures that do not sound in reality, and used those to modulate the sound.
The percussion instrument is a simple wooden cube, referred to as the "CUBE". The signals of the contact microphones are used to amplify or modulate sound. A footswitch allows the percussionist to switch between playing modes.

5. Discussion and Conclusion

We presented solutions for musicians to augment musical performances. We proposed a wireless wearable sensor system and a Max external object that delivers the attitude of each body part equipped with a sensor. Sensors don't provide absolute positions. But we showed how data from a Kinect camera can be combined to give the absolute position of the torso and "sensor" limbs attached to it, as well as the approximate position and orientation of limbs not equipped with sensors. The user can record a bank of reference gestures he wishes to recognize and use our multigrid DTW implementation to do so. We then introduced a software tool, the Surface Editor that allows to map sensor data to sound attributes, while preserving the close relation between musical gestures and sound processing.
In the future, we plan to combine the sensors with the Airplane [Crevoisier and Kellum, 2008], a previously introduced device that uses computer vision to track the interaction on a 2D surface, wether with hands, mallets or sticks. This alternative to the Kinect would allow to combine the attitudes of percussionist gestures with precise absolute location of contact points on the performing surface.

6. Acknowledgments

References and Notes:

1. Bettens, F. and Todoroff, T. (2009). Real-time dtw-based gesture recognition external object for max/msp and puredata. In Proc. SMC '09.
2. Cadoz, C. (1988). Instrumental gesture and musical composition. In Proc. of the 14th ICMC.
3. Crevoisier, A. and Kellum, G. (2008). Transforming ordinary surfaces into multi-touch controllers. In Proceedings of NIME-08.
4. Godoy, R. I. and Leman, M. (2009). Why study musical gestures? In Godoy and Leman (Eds.), Musical Gestures: Sound, Movement, and Meaning.
5. Jensenius, A. R., Wanderley, M. M. , Godoy, R. I., and Leman, M. (2009). Musical gestures, concepts and methods in research. In Godoy and Leman (Eds.), Musical Gestures: Sound, Movement, and Meaning.
6. Kellum, G. and Crevoisier, A. (2009). A flexible mapping editor for multi-touch musical instruments. In Proceedings of NIME-09.
7. Madgwick, S., Vaidyanathan, R., and Harrison, A. (2010). An efficient orientation filter for inertial measurement units (imus) and magnetic angular rate and gravity (marg) sensor arrays. Technical report.
8. Miranda, E. R. and Wanderley, M. M. (2006). New Digital Music Instruments: Control and Interaction Beyond the Keyboard.
9. Todoroff, T. (2011). Wireles digital/analog sensors for music and dance performances. In Proc. NIME '11.
10. Todoroff, T., Benmadhkour, R., and Chessini Bose, R. (2011). Multimodal control of music and fire patterns. In Proc. ICMC '11.

TOWARDS GEOSPATIAL CULTURAL PLANNING: STRATEGIES FOR LOCAL CULTURAL INNOVATION WITH LOCATIVE NEW MEDIA ART

Tanya Toft

This paper explores locative new media art in a contextual framework of cultural urban revitalization. I characterize two kinds of "site-specifics" in considering locative media art as a tool of "geospatial cultural planning". I propose the application of "location-based media" to the "mediated locality" in a "performative program" of locative media art, which facilitates a platform for cultural innovation among citizens.

This paper explores a conceptualization of locative new media art in a contextual framework of revitalization of urban spaces. The intersection of urban and new media studies has opened up a dynamic field of practice and research. The engagement of citizens and urban environments through mobile activities is explored in practices of urban planning and community development; for example, in experiments of mobilizing people to use their mobile devices to collect data in the urban for re-constructing a sense of cultural community around data maps, and, of mediating a locality through virtual overlays of augmented reality, or in site-specific multimedia installations. The significant attention toward site-specificity and locality in multidisciplinary practices of urban revitalization is the topic of consideration in this paper; in particular, the application of locative media art to strategic urban revitalization and community development. The paper asks: How can we consider the "program" of the locative media art project as facilitating socio-spatial relationships in a way that cultivates a site and the activities in it?

Meaning and Matter in Space and Place

I will begin this paper by considering a conceptualization of the structures of the environment in which locative media art projects "work," which is a condition for considering such projects as intervention strategies for urban revitalization. New media technologies, including mobile media, ambiguous and pervasive computing, have come to reconfigure our understandings and experiences of space and culture in between the microcosm of the everyday and the macrocosm of spatial flows. As noted by Scott McQuire: "If urban space has historically been defined by the relation between static structures and mobile subjects, this dichotomy is fast giving way to a hybrid spatiality characterized by dynamic flows which not only dissolve the fixity of traditional modes of spatial enclosure, but problematize the unified presence of the subject traversing the contours." [1] Manuel Castells' concept of the spaces of flow refers to "the material organization of time-sharing social practices that work through flows" and to the interrelated linkages across an infinite amount of local and global relationships. [2] In the spaces of flow, cities develop in between material and immaterial organizations as dynamic fields of shifting intensities and immersive environments, in which hybrid spatialities are formulating and reformulating new rhetoric's for its urban spaces.

With the development of spaces of flow, we moved from one kind of conceptual, spatial geographical structure to another. We moved from what Gilles Deleuze and Felix Guattari describes in "A Thousand Plateaus" (2004) as "striated space," which is delimited, organized and has rules, to "smooth space",

which is "flat" and contains no fixed elements, no barriers, and is unprogrammed. [3] In this conception, the spaces of flow has "smoothened" space, as it has broken down the fixed organizations of form, function and meaning. It is in this condition of smooth space, with a lack of consistency and pre-scribed functions, that locative media art projects become powerful in re-formulating the possibilities for appropriation, negotiation and imagination about locality, because site-specific media operates in the immaterial level of the spaces of flow but gains its matter from the space of places.

The Construction of Situations of Resistance

The mobile construction of situations was the program of the psychogeographic explorations of the 1960s (between 1957-1972) avant-garde movement, the Situationist International. Through the "dérive", a technique of rapid passage through varied ambiances, the Situationists explored a different appropriation of the city by navigating its psychogeography in a playful-constructive behavior of "drifting". The dérive is the route in locative media art projects. For example, in the second location-aware album of the music band Bluebrain's entitled "Listen to the Light", this uses a cell phone's built-in GPS-capabilities to let the music change as one moves around Central Park in New York City in a form of dérive (the project is to be released on October 4 2011) (www.bluebrainmusic.blogspot.com). The drift follows a psychogeographic map, which shows which locations are tagged with sound. In the dérive, a situation is constructed in the drift; in the re-composition of parts of experience by which an experienced "map" of the city is reformulated.

The Situationist intention was not just to interpret situations but also to transform them. Their ideas of resistance toward the homogenizing and disciplining effects of the functional urban planning ideas of the 1950s and 1960s called for the metro stations to be opened at night, for roofs to be available and designed for people to use them, for churches to be used as children's playgrounds, and for the distribution of artworks in cafés and pubs rather than museums. This was to be done within the aesthetic notion of the détournement, which the Situationists Guy Debord and Gil J. Wolman characterize in *Détournement as Negation and Prelude* as "the re-employment in a new unity of pre-existing artistic elements." [4] Characteristic of all instances of détournements is that they emerge from people's urges to appropriate and use the city in a desired way, which to different extents become expressions of claiming the city's urban territories. The Situationists apply the aesthetic concept of détournement to a vision of a "unitary urbanism" of social and everyday life, a form of unification of space and architecture with the social and individual body, of resistance toward the organizational form of the built environment. When we think of locative media art projects as détournements, they become site-specific explorations of a human geography and seeks to "reclaim the street" through experiments with methods for navigating, exploring and experiencing the city. This is a creation of site-specific, artistic re-claimed situations in urban space. These acts of appropriating urban environments form the conception of places to become more mobile in their composition as urban constructs, because their use changes and so does the system of practice they become a part of, which their future use is eventually thought into. The détournement constructs a situation in the reformulation, or re-employment, of an environment.

The situations of resistance found in the dérive and the détournement might "work" in two different, perceptual levels of city. These are illustrated in the two perspectives characterized by Michel De Certeau in the essay *Walking in the City*. De Certeau report from his position on top of the high-rise building of the World Trade Center, which gives him a birds-eye perspective on Manhattan, and sees how the city is laid out, legible and resolved, and how things relate to each other. [5] This is a particular logic of rationality of seeing in the city. In particular, if we consider Guy Debord's illustration of the

dérive in his psychogeographic map, although this is performed at the street level, it gains its significance from the re-composition of urban environments in the psychogeographic map on a mental level above the street – where the experienced urban elements are brought together to form a new map. The contrasting view, which he then describes, is explored in the act of walking in the city, of moving around on the street level. In the street-level perspective, the urban environment is a site of practice, embodiment, and sense-experience. The détournement "operates" from a street-level perspective, which is the level where the city is experienced and physically appropriated.

Location-based Media and Mediated Localities

The two perspectives sketched by De Certeau characterize two directions of spatial thinking in mapping and GIS technologies; as two directions in "the spatial turn," which with the developments in technologies and new mobile media came to change spatial conceptions and geographical imaginations. Edward Soja defines "the spatial turn" as "...fundamentally an attempt to develop a more creative and critically effecting balancing of the spatial/geographical and the temporal/historical imaginations." [6] Thielman characterizes the two parallel developments in the spatial turn as 1) a spatial turn in media studies, which can be characterized as concerned with how geographies shape and explain social processes and social action, and 2) a media turn in geography, characteristically concerned with how social processes shape and explain geographies. [7] These diverging approaches compose a double determination of the idea of "site-specificity" in the "genre" of locative media art projects.

The spatial turn in media studies is characterized by "location-based media", which is often explored through tagging and tracking with GPS and Wi-Fi. This is the spatial situation of the "geo-tagger," in which media documents geography, and by which our handling of space and place is reorganized sociotechnically. [8] Examples of this notion of locative media is found in the project "A Map of Our Own: Kwun Tong Culture and Histories," which is a multimedia project programmed for a discussion of urban renewal while Kwun Tong, a town in East Kowloon of Hong Kong, is undergoing a large urban renewal plan. The project started in 2009 and is scheduled to end with the end of the renewal in 2021 (www.kwuntongculture.hk). The project uses locative media in an audio-visual mix and rendering of sound, still image and moving image, which are documented on site and collected in a digital map of Kwun Tong. The project traces history, documents unique parts of culture and spatial practices, and raises public attention to the changes in the town in period of renewal. The collected media comes to compose a culturally shared narrative of Kwun Tong. The videos and images of Kwun Tong are collected in an online forum, which comes to formulate site-specificity in a birds-eye perspective, from which enactment (of mediating a form of cultural coherency) has been overlaid on the city. In this form of site-specificity, time becomes in a sense superior to space, which is literally illustrated in the organization of the project in a time line in the online forum.

The connection of people's geo-tagged urban experiences in a map of Kwun Tong online forms into what Scott McQuire refers to as "network logic." This follows the logic of interconnection in "the rhizome", in which every point is connected to innumerable numbers. [9] The connection of urban experiences and narratives in this network forms into situations of possibilities for negotiating urban practices and relationships in a mode of inter-subjectivity, in a Habermasian sense of community. Christine Satchell identifies a potential in the culturally loaded, social nature of using the mobile phone and the "mobile iden-

tity" around such practices, to be re-contextualized into a notion that includes involvement in the collective enhancement of one' physical community and environment. She points at an opportunity of re-contextualizing the mobile phone as an artifact that encourages users to identify themselves as culturally and civically aware individuals of urban citizens. [10] Through the shared memories of Kwun Tong, the city's citizens are invited to discuss and negotiate the future of the city, based on their shared memories of the city's past, during the urban renewal process. I will point at a significant potential in this network logic, when considering how "program aspects" of locative media art might apply to a framework of urban revitalization. The network, and the logic among participants that forms it, for example about a place's history and cultural narrative as in the given example, can enhance an intercultural sense of citizenship and foster a *shared* sense of meaning in the local, and a platform for cultural innovation.

The second direction of practice in the spatial turn, which followed the media turn in geography, is found in the "mediated locality." This is explored in a phenomenological mode of sense-experience, in a sense of re-animating a place. [11] The mediation of a locality or urban environment is for example found in projects of augmented reality – in which the subject is enacting with the physical world through a virtual overlay. The project "Museum of the Phantom City" (2009) by Irene Cheng and Brett Snyder is a locative media art project that displays could-have-been architecture in urban spaces of Manhattan, New York City, in an augmented layer that is only visible through one's phone, and only as one goes by the physical location where the architecture was supposed to have been built (www.phantomcity. org). The form of site-specificity formulated in this project depends on the content that plays out in a particular physical environment. Another example of augmented reality is the "MoMA AR Exhibition" by Sander Veenhof and Mark Skwarek, which was part of the Conflux Festival program in 2010 (www.layar. com/layers/moma). In this project, the physical space inside the MoMA in New York City hosts a virtual exhibition, which is only visible through people's cell phones. In the mediated situation in this and similar projects of mediated localities, the real-place experience can be considered as superior to the real-time experience.

Perhaps we can think of mediated localities with support from Anders Fogh Jensen's Deleuze-inspired concept of "the groove," proposed in his dissertation "The Project Society" (2010). The "grooved space" is a marking of an environment in the "smooth" space of the digitalized society. The groove invites for people to stop up and join a "projectary activity," which Fogh Jensen characterizes as a structure of organization in the project society. This has followed the hierarchical organization of the disciplinary society as the key organizational mode of the contemporary developed society. [12] The groove of the mediated locality, mediated through locative media art projects, can be considered a "marking" in the meeting between the material and the immaterial urban level. Locative media art projects conceptualized as grooves interrupt the form of appearance and mode of experience of the urban fabric and invite for a re-appropriation of a location, if only on an imaginary level. This echoes the Situationist quest for liberation from the pre-scribed organization of the city's urban environment in the détournement. Grooves can apply new goals to a place, by inviting for new creations of meaning. The projectary activity that takes up the mediated locality in the groove, which interrupts the routines of a place and allows for local re-imagination, can be considered for a significant program aspect in the sense that it is situated in the specific locality. This includes a creative thinking about "acting in the world" by creating a territory for the projectary activity.

The "groove" in a mediated locality is found in the site-specific renewal project "Mixed Reality Tent" (2009) by IP City in Graz, Austria. In this project, mixed reality technology – the combined representation of real and overlaid digital data – is enclosed in a shelter on the site-specific location of the urban re-

newal project (http://studierstube.icg.tugraz.at/ipcity/mrtent.php). With participants of both professionals and citizens, the shelter hosts a workshop for a creative space for experiments in integrating many different points of shared views on a mixed-reality reconstruction site. While this example represents a site-specificity of a mediated locality, it also represents a program of a détournement in the projectary activity.

Conceptualizing the "Program" of Urban Intervention in Locative Media Art

The "program" of locative media art, when conceptualized in a context of urban revitalization, regards how the project engages with socio-spatial practices in an urban environment. The program employs forms of knowledge to reform or radically challenge an operation, to reorient toward new goals and objectives, and to act upon the desires, aspirations, needs, and attributes of the agents within them. To think of a program in locative media art in this respect, is to think of how the locative media art is coded with an intention to *affect* a locality in a particular way, by affecting the spatial practices and urban imaginations among citizens.

When considering the program, we are to consider what the locative media art project should and could "do," meaning how it could transform a place by intervening in a place's socio-spatial practices. The program characteristics of respectively location-based media and mediated localities, which I have pointed out in this paper, regard the connection of subjects in a shared sense of project and cultural consensus in a network, which is possible from people's site-specific geo-tagging and spatial documentation through mobile phones; and the groove, which is established in the mediated locality and applies new goals to a place and invites for projectary activities which reformulate local meaning. These, I propose, are to be thought together in a program of locative media art as a tool of urban revitalization. While the program of the location-based tagging allows for a particular shared sense of geographic interpretation and cultural consensus in a dimension of networked de-territorialization from the fixed form of the urban, the program of the mediated locality is that by which the intervention is situated in place – and designed to operate for a particular project in that place, building on top of the place's specific aesthetics. Through location-based media of geo-tagging, people are enabled to identify features of embodied interaction and develop a language for shared creativity in a network-extension of the relational site. The mediated locality serves to direct this attention to a geographical site-specificity to bring the intersubjective creativity "back to place."

The Performative Program

I will propose that such a conceptualization of a program of locative media art, to function as a tool in urban revitalization projects, is "performative" rather than "performing," as it responds to a processual aim of urban revitalization through an aesthetics that is designed, or programmed, with attention to the active action of the installation in the urban environment. While the program of the "Listen to Light" project and the "MoMA AR Exhibition" can both be considered as performances, with the subject as an audience of a pre-defined experience, a performative program is one that provides the subject with a lens to explore without the narrative being pre-defined. The narrative is to be constructed along with the exploration, and among participating subjects in the network.

In the performative program, which combines the two modes of site-specificity in organizing location based media to work in mediated localities, geo-tagging is combined with sense-experience in the "geo-

spatial"; meaning, the mediated narrative is concerned with place but its matter of intervention is constructed in the network among participants. This enables a form of cultural innovation among citizens in the double experience of site-specificity. This opens up for questions to be pursued further, about how the socio-spatial is being produced with locative media, and about what motivates citizens for participation in projectary activities in such forms of "geospatial cultural planning". What I am proposing here is a consideration on the potentials in the program of projectary activities in locative media art to enrich urban development by bringing citizens together in networks while reveal new possibilities in the locality of the urban environment.

References and Notes:

1. *Scott McQuire, The Media City: Media, Architecture and Urban Space (London: SAGE Publications, 2008), 132.*
2. *Manuel Castells, The Rise of the Network Society: The Information Age: Economy, Society and Culture, Volume I (Cambridge: Oxford-Wiley, 2002), 442.*
3. *Gilles Deleuze and Felix Guattari, A Thousand Plateaus (New York: Continuum, 2004), xii.*
4. *Guy Debord and Gil J. Wolman, "Détournement as Negation and Prelude," in Situationist International Anthology (Berkeley: Bureau of Public Secrets, 2006), 67.*
5. *Michel De Certeau, The Practice of Everyday Life (Berkeley, CA: University of California Press, 1988), 92.*
6. *Edward Soja, "Taking Space Personally," in The Spatial Turn: Interdisciplinary Perspectives (New York: Routledge, 2009), 11-35.*
7. *Tristan Thielman, "Locative Media and Mediated Localities: An Introduction to Media Geography", in Aether: The Journal of Media Geography 5a (2010): 1-17.*
8. *Tristan Thielman, "Locative Media and Mediated Localities: An Introduction to Media Geography", in Aether: The Journal of Media Geography 5a (2010): 1-17.*
9. *Scott McQuire, The Media City: Media, Architecture and Urban Space (London: SAGE Publications, 2008), 23.*
10. *Christine Satchell, "From Social Butterfly to Urban Citizen: The Evolution of Mobile Phone Practice," in Handbook of Research on Urban Informatics, ed. Marcus Foth (Hershey, PA: IGI Global, 2009), 353-365.*
11. *Tristan Thielman, "Locative Media and Mediated Localities: An Introduction to Media Geography", in Aether: The Journal of Media Geography 5a (2010): 1-17.*
12. *Anders Fogh Jensen, Projektsamfundet (Århus: Århus Universitetsforlag, 2010), 406.*

THE UNFORGIVING RATIO

Darren Tofts

This essay engages with the author's recent experiments in redefining urban space as aesthetic space. From this experiment it will offer a critical discussion of the relations between maps and territories, cartography and topography. This underlines a sense of abstraction, an unforgiving ratio that we continue to resolve and simply live as second nature in our negotiation of space and its representation.

Figure 1. Melbourne/Rome composite map. Darren Tofts, 2011.
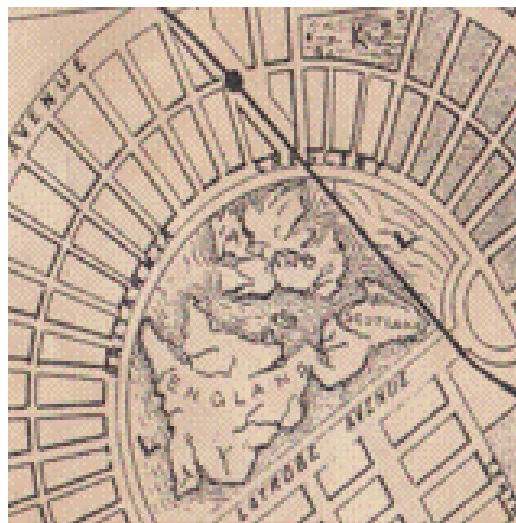
Figure 2. Hydrographic map design for the Port of Melbourne, 1860 (detail). Courtesy State Library of Victoria.

The Unforgiving Ratio

The notion of "unsitely aesthetics" carries with it a number of ambivalent inflections to do with the space of art, its installation and its reception. It presumes the convergence of remote and telematically mediated spaces made possible through personalized mobile media. The unsitely in contemporary media art practice transcends an aesthetically sanctioned notion of 'site' in favour of public spaces in which art would not be expected to be encountered or recognized (hence unsightly), or would seem to be entirely out of place if it were. This paper is in part a critical reflection on an experiment in unsitely aesthetics I conducted in February this year, which I have blandly titled *Melbourne/Rome*. What emerges from the specific details of this work is a more general, philosophical critique of the relations between cartography and geography with respect to the construction of site. Rather than pursing a typically postmodern recursion that posits the exact blurring of the two, it argues for a more radical displacement; a rupture in which the map and the territory reside uncomfortably in an awkward, algorithmic relationship with each other, what I call the unforgiving ratio.

The title *Melbourne/Rome* is deliberately nondescript in order to foreground a largely didactic engagement with the process of conceiving, performing and documenting an unsitely aesthetic. Taking its starting point from the Situationists' détournement of maps, I wanted to use the experience of physically walking through the streets of the immediate and embodied city in which I live (Melbourne) and map it on to a virtual journey through a remote city. Adopting the rule-governed principles of certain OULIPO artists (in particular Raymond Queneau and Italo Calvino), a set of personal preferences established the guidelines and principles for determining the city that was out-of-sight. First, the last international city which I have visited (Rome), second, where I stayed during that time (the Campo dei Fiori), and third, the exploitation of an essential difference between the two sites (the definitive grid structure of the Melbourne CBD and the labyrinthine tangle of streets that circumscribe the Campo dei Fiori). The idea behind this mapping was to see what might happen in the way of sitings in one city and mark anything of conspicuous interest on the appropriate map. The contrast of the topographical characteristics of each city was chosen as a variable, a potential, generative algorithm that allowed for potential convergences of co-ordinates that were beyond my conscious choice.

I selected the judicial section of the Melbourne CBD for obvious reasons, in that it was as far from the local, residential and community vibe of the Campo dei Fiori as Melbourne is from Rome in geographical space and time. I partitioned a selected grid ofMelbourne streets roughly comparable in scale to the area around the Campo dei Fiori with which I was familiar. Then using tracing paper, I outlined a manifold map or palimpsest of both areas so that a siting in one city could easily be mapped on to an equivalent coordinate in the other. Then, using the Streetview function in Google Maps, I traversed the equivalent co-ordinate in Rome in the hope of synchronicities; what Guy Debord described as a "possible rendezvous" (Debord, 2006, 65). The capacity of Streetview to simulate a sense of movement, albeit highly stylized, translated the scanning of the eye over the screen into a synaesthetic analogue of walking. This was a kind of virtual take on the dérive. It was weirdly suggestive of a kind of perambulation that makes sense in the world of atoms and friction, especially with respect to its connotation of drifting. The spectral phasing of the screen as the Streetview image resolves itself into clarity creates the illusion of movement along the street. This ocular mobility is akin to the physical sensation of walking towards and pausing in front of a specific *something*. At this moment I become, to use Timo Kopomaa's term, an "*e-flâneur*" (Kopomaa, 2000, 20).

The results of this process have been detailed elsewhere (Miranda, forthcoming). I am less interested here in reporting on the outcomes of the experiment than reflecting upon some conceptual tensions

that emerged from it; tensions that have implications for the notion of the unsitely as the "*superimposition of real and virtual space*". If we accept that real here refers to my embodied, quantum experience of being in Melbourne, then the virtual is my image of a specific part of Rome where I cannot be at the same time through means other than mediation. The use of Google Streetview offered a canny, pictorial solution to this vectoral assemblage of here and there. Rather than telematically feeding me an image of Rome in a common global time of now, it captured an image of a co-ordinate that exists despite the need for a common here and now. In other words, the Google image of a streetscape in Via del Biscione was not live, and nor did it need to be live for a conceptual overlapping of space. After all, it is difficult to know when specific images archived in the Streetview database were actually taken. This in fact removes the need for a temporal link in the process, maintaining the emphasis on site.

Semiotically, then, the Streetview images constitute an index of a location in Rome where I have been, or, after Roland Barthes, an experience "that-has-been" (Barthes, 1984, 77); a photographic supplement for a somewhere that is not here, that I know exists while I am in Platypus Lane in Melbourne at 9.45am, Eastern Standard Time.   Like a live televisual feed, it is an index of a remote elsewhere aligned conceptually with my immediate here and now (just as a phone conversation is symbolic in the semiotic sense). The index provides a sense of coincidence that makes sense, a vector that resolves the abstraction of mediated real-time telepresence. However Streetview was not my first choice of media to establish counterpoints between two distinct and remote locations in time and space. I had originally planned to use GPS co-ordinates, in a similar manner to McKenzie Wark's book *Dispositions*, an experiment in real-time diarizing of the author's experience of a here and now "lived increasingly in the shadow of the satellites" (Wark, 2002). Wark's use of global positioning satellite co-ordinates is more abstract again than the symbolic and indexical registers of voice and image, adding another hand-held media device to the kit of the e-flâneur. Polemically Wark's project sought to draw attention to the increasingly surveilled nature of private space. Aesthetically, his preface of every entry with a topographic point of latitude and longitude underlines the highly abstract, even absurd nature of mapping lived experience in such a manner. His bio note is suggestive of this: "He lives at about 40.7°North and 073.9° West, aka Williamsburg, New York City" (Wark, 2002).

It is necessary to underline the abstract nature of any and all forms of mapping that seek to converge remote sites in the name of unsitely aesthetics. Our use of maps has acquired a familiarity over time, a virtual assurance that they can be read as if they are semblances or facsimiles of the spaces they represent. I want to reclaim the abstraction of cartography as a formal characteristic of contemporary media art practice. To get to this point I need to make a brief digression into the relations between maps and territories. The very notion of cartography is premised on a figurative geometry of scale, a convenient, disproportionate projection of space that makes it apprehensible to the gaze in real-time. Gerardus Mercator described his famous 1569 projection of the world as an "augmented description of Earth corrected for the use of sailors". Perhaps the first instance of augmented reality, Mercator's map revealed the approximation of an actual terrain that could never be experienced other than as a projection. His legacy of a modified form of vision was hardwired into the collective psyche of human perception for centuries; a technique of observation that shaped modernist epistemology's command of nature through scientific knowledge. In his *Simulations* (1983), Jean Baudrillard's prefatory use of Ecclesiastes' definition of the simulacrum as "the truth which conceals that there is none" signaled the emergence of postmodern skepticism towards the grand narratives of modernity and in particular, to quote Jorge Luis Borges, "exactitude in science".

Borges revisits the equation of the map and the territory many times in his fictions, notably in "Partial Magic in the *Quixote*", where he quotes the 19th century Idealist philosopher Josiah Royce imagining a

scale map of England carved into the very terrain of England itself, in which "no detail of the soil of England, no matter how minute… is not registered on the map", including a map of the map of the map, and so on to infinity (Borges, 2007, 195-196). However his famous 1946 fragment "On Exactitude in Science" is a parable of the consequences of a literal 1:1 scale in cartography. Here Borges imagines a souped up version of Mercator's projection in which the map is an exact copy of the territory "point for point", whereby "the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province" (Borges, 2000, 181). The idea of a map that is the scale of a "mile to a mile" is also encountered in Lewis Carroll's 1893 text *Sylvie and Bruno Concluded*, where the absurdity of the map standing in for the territory it represents also presages the advent of the hyperreal. This map is so big that it has never been rolled out as the "farmer's objected: they said it would cover the whole country, and shut out the sunlight!" Consequently, as Mein Herr explains to Bruno, "we now use the country itself, as its own map, and I assure you it does nearly as well" (Carroll, 1893, 169).

The map is a surrogate or proxy of the space it projects. The episteme of projection implies a necessary amnesia whereby the territory and its other avatar, geography, are completely forgotten. The map is a fetish that stands in for an absent, impossible presence. And so we return to the unforgiving ratio of scale. It is unforgiving in that it persistently foreshortens the relationship between the territory and our capacity to perceive it. Mercator's projection of the earth flattens out scale, topography, distance and time into a facsimile, a necessary fiction. It is a reminder that cartography relates us in inhuman ways to the space we live in and, more particularly, the spaces that are elsewhere, out of sight and out of site.

The *Melbourne/Rome* map manufactured a semblance of flow and consistency, whereby streets seemed to blend naturally into each other (see Figure 1). Here Via dei Baullari runs in tidy parallel with Lonsdale Street, as do Via del Biscione and Bourke Street. In the context of the composite map, things converge in ways that bear absolutely no relation to anything other than the map itself. But nor should they be obliged to, since the stylized figuration of scale is an approximation of what actual space would look like if we could see it from an inhuman point of view. The map works because of a distortion of the difference between the two sites, not any perceived fit . The unsitely and unsightly come together here not as a manifestation of scale, but as a plausible palimpsest, a tracing that is self-referential and makes sense within the poetic of the *Melbourne/Rome* experiment itself.

And in this we are privy to something like a nomadic, synchronous and ideally mobile point of view of unsightly and unsitely space. As I have been using these terms throughout this discussion their semantic, orthographic and phonetic difference can only be grasped visually rather than sonically. Their difference can only be seen but not heard. But as sonic events of time, of duration and delay, they remain equivocal, elusive and beyond immediate comprehension. This undecidability of site and sight is the *pharmakon*of deconstruction, the ambivalence of either *and* or, the unavoidable, ineradicable slippage between sound, image and sense. This aporia is also at work in our perception of space, it is the unforgiving ratio that must, of necessity, abstract the way we perceive geographic space. Cartography smoothes out and reconciles the abstraction of ratio to create the illusion that we have mastered the relations between space and time. In particular it manipulates our ability to believe that we can comprehend the here and now in relation to a distant there an now, where Melbourne and Rome can exist in the world simultaneously from the embodied experience of being in one of those cities. This inevitable flickering between presence and absence, here and there, unsightly and unsitely will continue to beguile its aesthetic practitioners for some time to come.

POSTSCRIPT

During the research undertaken for the *Melbourne/Rome* project I came across this map in the State Library of Victoria (Figure 2). It was made in 1860 and details plans for the western development of the Port of Melbourne. It features the design of an ornamental pond with two horticultural islands as its centerpiece. The islands are cultivated to resemble Great Britain. Here is a different version of the decorative *mise en abyme* of heraldry, the map that contains itself in miniature. It is a powerful image of empire and colonial expansion throughout the globe, a patrician homeland carved to scale into its antipodes. The notion of the antipodes presumes otherness, a subordinate relation to a distant and autonomous self.   There could never be a hyperreal synthesis of map and territory here, whereby the map of Great Britain covered the territory ofAustralia. Apart from the obvious discordances of terrain, the spirit of Republicanism would, I like to think, prohibit such a travesty. The token Britain, suffice to say, was never built. But this hardly matters for even the idea of it sounds like a 'Pataphysical art project of the kind that Alfred Jarry might have cooked up while riding around Parison a bicycle. In the spirit of 'Pataphysics it invokes an imaginary response to the very real condition of presence at a distance. This image of little Britain in a distant colony is an incipient allegory of unsitely aesthetics. It evokes an image, a metaphor of possibility for unifying site and sight, sitely and unsightly that we can glimpse in the age of synchronous, mobile media. It is the intuition of a form of perception to come, a way of seeing also intuited in a rhetorical question asked by Paul Virilio and Sylvère Lotringer in *Pure War*: "When we can go to the antipodes in a second or a minute, what will remain of the city? What will remain of us?" (Virilio and Lotringer, 1988, p.62).

References and Notes:

1. *Roland Barthes, Camera Lucida. Reflections on Photography, trans. Richard Howard (London: Fontana, 1984), 77.*
2. *Jean Baudrillard, Simulations, trans. Paul Foss, Paul Patton & Philip Beitchman (New York: Semiotext[e], 1983), 1.*
3. *Jorge Luis Borges, Labyrinths. Selected Writings and Other Stories, ed. Donald A. Yates & James E. Irby (New York: New Directions, 2007), 195-19.*
4. *Jorge Luis Borges, The Aleph, trans. Andrew Hurley (Harmondsworth: Penguin, 2000), 181.*
5. *Lewis Carroll, Sylvie and Bruno Concluded (Los Angeles: The Library of the University of California, 1893), 169.*
6. *Guy Debord, "Theory of the Dérive," in Situationist International Anthology, trans. & ed. Ken Knabb (Berkeley: Bureau of Public Secrets, 2006), 65.*
7. *Timo Kopomaa, The City in Your Pocket. Birth of the Mobile Information Society (Helsinki: Gaudeamus, 2000), 20.*
8. *Darren Tofts, "Possible Rendezvous: Art as Accident in Urban Spaces," in Uncertain Practices. Unsitely Aesthetics, ed. Maria Miranda (Berlin: Errant Bodies Press forthcoming).*
9. *Paul Virilio and Sylvère Lotringer, Pure War, trans. Mark Polizzotti (New York:Semiotext(e), 1988), 62.*
10. *McKenzie Wark, Dispositions (London: Salt Publishing, 2002).*

COMPUTERS AS METAPHOR, MINDS AS COMPUTERS; NOTES TOWARDS A DYSFUNCTIONAL ROBOTICS

John Tonkin

I am building a series of small robots that explore different approaches to thinking about cognition. Computational theories of mind are used by cognitive scientists as a model of how to build an electronic mind and by psychologists to understand the human mind. I want to complicate these cognitivist ambitions through the building of a nervous robotics that is situated in the everyday behavioural realities of contemporary dysfunctional life.

Fig 1. attached/detached : robot love for beginners, 2011, John Tonkin, custom hardware and software. Copyright John Tonkin.

I am building a series of small robots that explore different approaches to thinking about cognition. This paper presents some background material in the development of this project.

Cybernetics was defined by Norbert Wiener in 1948 as the science of communication and control in the animal and the machine (Wiener 1948). It used ideas of circuits, feedback, and information flow to describe how systems, both organisms and machines, functioned. Many of the core group of early cyberneticians had backgrounds in psychology, psychiatry and psychoanalysis. Some practitioners in these fields have since adopted cybernetic models to conceptualise their research, using a language of feedback loops and homeostatic control systems to describe the (mis)workings of the human mind. For example; Gregory Bateson wrote a paper titled 'The cybernetics of "self": a theory of alcoholism' (Bateson 1972)

Jean-Pierre Dupuy suggests that the development of cybernetics represented not so much the anthropomorphisation of the machine as the mechanisation of the human (Dupuy 2000). This is perhaps most obviously made manifest in computational theories of mind which have been used by cognitive psychologists as a means of understanding the human mind and by cognitive scientists as models of how to build an electronic mind. They see the mind as an information-processing system and thought as a form of computation. These symbolic approaches to thinking about the mind have been challenged by more embodied and embedded approaches to cognition and perception. This has been reflected through the development of a number of bottom-up approaches to AI and robotics, such as neural networks (McCulloch, Pitts 1943) and behaviour based robots (Brooks 1986), that are based on ideas of reactivity and situatedness rather than higher level symbolic modelling.

AI researchers, regardless of their approach, are generally committed to building functional engineering tools that efficiently solve real world problems. If we are to take seriously the concept of a computational model of the mind; then does this not need to embrace the dysfunctional as well as the functional? I plan to investigate this question through the building of a nervous robotics; a robotics situated in the everyday behavioural realities of contemporary dysfunctional life. These robots are more likely to rock nervously in the corner than to lock you out of the spaceship ("Open the pod bay door, Hal. Sorry Dave, I'm afraid I can't do that" (2001: A Space Odyssey)) or attempt to enslave humanity.

The robots that I am building for this project draw from a number of different psychoanalytic theories as well as more generally from a folk psychology conception of the mind as being the home of internal mental processes such as motives, desires, phobias and neuroses. They use a range of computational approaches, for example Brooks' subsumption architecture (Brooks 1986), to create layered hierarchies of behaviours and stimulus/response reflexes. For ISEA 2011 I have built "*attached/detached: robot love for beginners*" which consists of two robots that go through an ever shifting interplay of insecurity and dismissiveness with occasional moments of mutual happiness. These robots are primarily focussed on seeking/avoiding each other and are oblivious to the audience. Their behaviours are based around attachment theory. Attachment theory grew out of research by psychoanalyst John Bowlby in the 1950s. It was further developed with developmental psychologist Mary Ainsworth in the 1960s and 70s. It concerns the relationship between infants and their primary caregiver. Bowlby was influenced by cybernetics. The young child's need for proximity to the attachment figure is balanced with a need for exploration in what he described as a homeostatic control system. It was extended in the 1980s to encompass attachment styles in adult romantic relationships. These different styles (secure, anxious-preoccupied, dismissive-avoidant and fearful-avoidant) corresponded to different combinations of a person's atti-

tudes (positive or negative) towards themself and towards their partner. I further explore the development of attachment theory as an example of the use of cybernetics to model human behaviour in a paper that I will be presenting at Rewire 2011.

I am interested in how the audience will react to the robots' behaviour and am especially interested to explore the lower boundary of computational complexity that still evokes some sort of projection / anthropomorphism in the audience. Simon Penny has produced several robotic art projects including *Petit Mal* (1993-95). This low tech looking robot (it resembles a bicycle) reacts to the movement of people in its immediate vicinity. It follows them around curiously yet backs off if they get too close. Penny used a bottom up approach to create a system of layered behaviours similar to that proposed by Brooks.

People immediately ascribe vastly complex motivations and understandings to the Petit Mal. The robot does not possess these characteristics or capabilities, they are projected upon it by viewers. This is because viewers (necessarily) interpret the behavior of the robot in terms of their own life experience. In order to understand it, they bring to it their experience of dogs, cats, babies and other mobile interacting entities. The machine is ascribed complexities which it does not possess. This observation emphasises the culturally situated nature of the interaction. The vast amount of what is construed to be the `knowledge of the robot' is in fact located in the cultural environment, is projected upon the robot by the viewer and is in no way contained in the robot.(Penny 1997)

Australian artist Mari Velonaki has described something similar with regard to her Fish-Bird project. "The project has demonstrated that audiences are attracted to kinetic objects that represent 'characters' not because of the way they look but because of the way they behave." research statement (http://mvstudio.org/cms/wp-content/uploads/2009/08/ResearchStatement_VisualArt_Fish-Bird.pdf).

In his book titled "Vehicles, Experiments in Synthetic Psychology", Valentino Braitenburg describes a series of thought experiments that involve the building of a succession of simple robots that use a bottom up approach that is not unlike the approach that I am taking for my own robots.

"We will talk only about machines with very simple internal structures, too simple in fact to be interesting from the point of view of mechanical or electrical engineering. Interest arises, rather, when we look at these machines or vehicles as if they were animals, in a natural environment. We will be tempted, then, to use psychological language in describing their behavior. And yet we know very well that there is nothing in these vehicles that we have not put there ourselves." (Braitenberg 1984)

"It is actually impossible in theory to determine exactly what the hidden mechanism is without opening the box . . . A psychological consequence of this is the following: when we analyze a mechanism we tend to overestimate its complexity." (Braitenberg 1984)

This last statement of Braitenberg's is particularly interesting in terms of my broader project of thinking about cognition. Perhaps the "hard problem" of consciousness isn't actually so hard! This could lead us to a discussion around embodied cognition, but I shall save this for another time.

References and Notes:

Gregory Bateson, Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology (University Of Chicago Press 1972)

Valentino Braitenberg, Vehicles, Experiments in Synthetic Psychology (MIT Press, 1984)

Rodney Brooks, A robust layered control system for a mobile robot (IEEE Journal of Robotics and Automation 2(1): 14-23. 1986)

Jean-Pierre Dupuy, The mechanization of the mind; on the origins of cognitive sciencetrans. M B De-Bevoise (Princeton University Press, 2000)

Simon Penny, Embodied Cultural Agents at the Intersection of Robotics, Cognitive Science and Interactive Art ed. K Dautenhahn, Working notes of the Socially Intelligent Agents Symposium (Menlo Park Calif.: AAAI Press. 1997)

Norbet Wiener, Cybernetics or Control and Communication in the Animal and the Machine (John Wiley & Sons 1948)

HERE TO THERE AND IN BETWEEN: COMMUTING THROUGH PERCEPTION

Jack Toolin

"Here to There" will investigate how perceptions about the passageway between home and work, as well as the general relationship between the two, are influenced by various forms of (social) media and data. How do commuter perceptions compare to those of the community members, and to the general perception of a community as it can be perceived on the Web in the form of chats, blogs, images, and so forth?
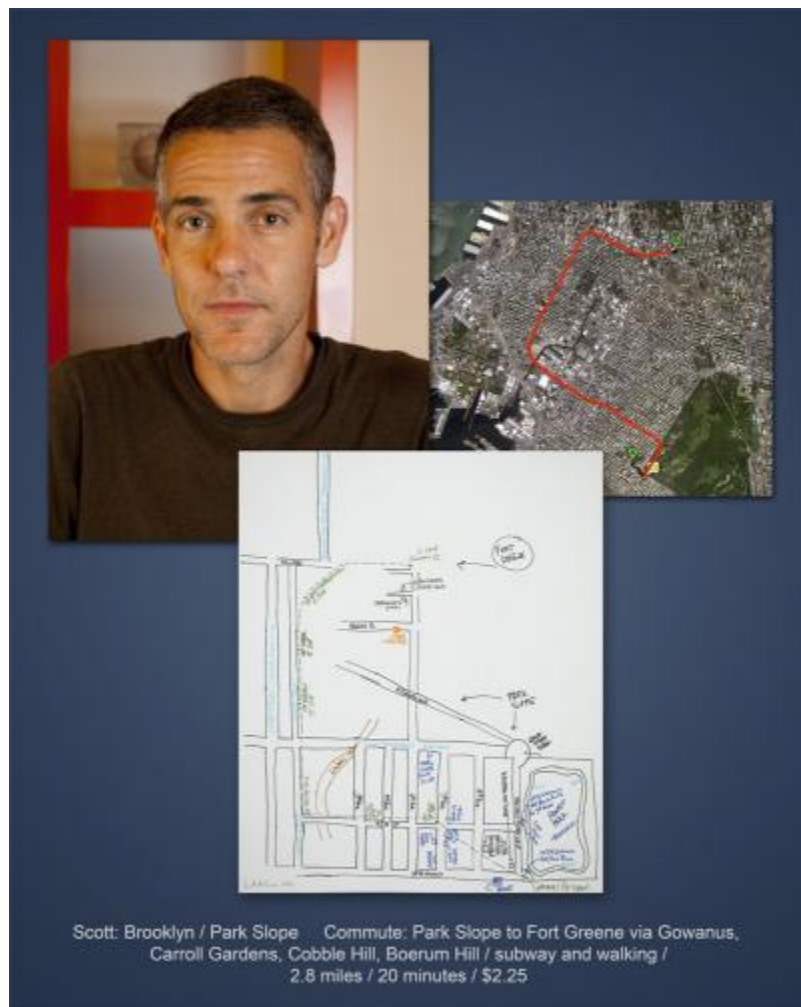
Scott_map, 2011, Jack Toolin, archival print and digital media.

Millions of people in the United States spend millions of hours every year commuting to and from work, and this is true for industrialized countries around the world. Commuting consumes an enormous amount of time and resources, whether it's by personal or public transportation. Yet, due to lifestyle choices and to the design of most metropolitan areas, commuting has become a necessity, a fact of life, something that's taken for granted for large parts of the population.

My project, Perceptions of the Commuting Ethnographer, investigates commuting with multiple interests in mind: the physical aspects of the commute (distances traveled, route characteristics, etc.); the commute as social phenomenon, reflecting upon the commuter's relationship to the communities they pass through; the relationship between home life and work life; finally, the relationship between individuals and the growing transnational economy that makes for what Saskia Sassen has termed 'Global Cities,' [1] key hubs in a global network of information and monetary exchange.

I have begun by video recording the stories of commuters in the New York metropolitan area and the San Francisco Bay Area. Along with the stories I am asking participants to draw their commute routes from memory and to draw maps of what they consider to be their communities. The routes will be recorded with GPS and the communities researched using census statistics as well. But the hand drawn maps, with their distortions of scale and misperceived spatial relationships may indicate perceptions of comfort or discomfort, the relative importance to ones daily routine, the people, places and activities that the commuters more or less identify with, hypothetically at this point. Lastly, a smartphone app for real-time commuter surveying will be distributed in order to capture commuters' perceptions as they travel.

The project will have various manifestations, but its initial phase will consist of juxtapositions of imagery (still and video), data, and commuter stories. This paper lays out some of the theoretical groundwork underlying the project.

History of Commuting

Commuting is largely a result of the industrial revolution: lifestyles were transformed by the centralizing effects of increasingly technological forms of production, and society evolved away from agrarian production to manufacturing as the predominant source of work. Of course this development proceeded through the 20th century. Commuting itself has undergone its own development, moving from being mostly contained within urban areas (referred to as ICC: inside the central cities), to commuting from outside of urban areas (referred to as OCC: outside the central cities), and then increasingly between suburban areas, as cities decentralized into metropolitan areas due to the post-War middle class expansion, and the ensuing suburbanization – what economist Robert Reich has referred to as the Great Prosperity. [2]

While commuting in the late 19th and early 20th centuries was largely characterized by flows into and out of city centers, the 1970s, '80s, and '90s saw commuting increasingly done from suburb to suburb. Today, approximately 50% of the adult US population commutes; approximately 31% of that commuting is suburb-to-suburb commuting, and suburb-to-city commuting is approximately 14%. [3] This has occurred while the suburban growth in industries of all types outpaced that of city centers as businesses took advantage of the suburbs for reducing their 'transaction costs' (business overhead as well as general costs of living). [4] This period has also seen the nature of business itself in the US change in various ways, growing more in service related areas (from consumer services to financial services) than in manufacturing, and increasingly entwined in global relations. The world economy has changed as well, as it is increasingly composed of TNCs (transnational corporations), whose power and reach in some ways defies nation-state boundaries. [5]

The commute is often looked upon as an arduous task that is performed only out of necessity. But commuters, like all people, can prove to be resourceful and turn the routine into something more fulfilling.

Much like the everyday activities that became the substance for critical reflection by theorists of the mid 20th century such as Lefebvre and Debord, commuting is full of possibilities for artistic (aesthetic? conceptual?) investigation. This paper and the project associated with it are intended to do just this.

The Effects of Commuting on Community

It is easy to visualize these community effects as they have been mythologized in popular fiction about city life; for example, 'the wrong side of the tracks' characterization. We might refer to the 'wrong side of the tracks' divide as a lateral divide created by the commuter corridor. However, a 'longitudinal divide' may also be a component, as commuters often live in communities that are quite different (economically, ethnically, racially, politically, etc.) from the communities that they commute to or pass through. Both can result in what cultural geographers refer to as residential segregation. [6]Commuting allows for greater separation between home life and the other, which may be primarily work life, but is also the community in which one's work is located. Also, due to what can be referred to as the 'transportation divide' that exists within the U.S., different economic classes are capable of or choose to commute by more or less exclusive modes of transportation. So within the various modes of commuting there exists, to varying degrees, a class divide.

On the one hand these social divides are not new; they accompany the existence of civilization itself. On the other hand, one can point to examples where technology has been consciously used to reinforce social boundaries (Robert Moses' highway network between Manhattan and the surrounding affluent white suburbs is an example often pointed to.) Class divides in commuting can also merely be extensions of preexistent stratifications within society.

The subway presents another type of transportation divide, one that splits the subterranean traveler from the communities above: one may be exiting Manhattan in a subway car below the high finance district of Wall Street, while the car is filled with service workers making their way to New York's outer boroughs. Riding on any number of New York subway trains one can observe a complex mix of commuters from all walks of life, and yet this mix gravitates towards different cultural groups depending upon the neighborhoods being passed through. One observes different homogeneities in different parts of the city, and at different times of the day: riding the L train into trendy Williamsburg at midnight is a different experience than taking the same train during rush hour.

However, this is a rather dystopic perspective that may be misguided, for as much as creating divisions, commuting creates spaces for cultural juxtapositions, allowing for one community to experience another, if only from a distance. Riding the commuter train up the San Mateo peninsula into San Francisco, one passes by the campuses of hi-tech firms in Mountain View, the mixed development neighborhoods of Redwood City, the shoreline of the Bay itself, and the transitional southeast side of San Francisco's China Gulch. If only from a visual standpoint, the commuter is taken out of their locality and exposed to life in these other communities. On the other coast, the Long Island commuter driving their car into Manhattan on the Long Island Expressway passes the trees and lawns of Rosalyn Heights and the frontage road neighborhoods of Queens, arriving at their parking spot set amidst Midtown high rises.

The exposure to these communities, superficial as it might be, may generate reflection upon one's community in contrast to these others. Numerous studies have been conducted regarding the effects of commuting upon commuters' sense of belonging to a given community, as mobility has gathered increasing interest in the social sciences. As Per Gustafson points out in *Mobility and Territorial Belonging*,

the relationship between work-related travel and territorial identification is complicated by the types of mobility in consideration, as well as the age, gender, nationality, etc., of the traveler. [7] Using statistics from a 2005 survey done in Sweden, and referring to several other studies, Gustafson considers commuters' identification with local, regional, national, and international (European Union) territories given the types of travel they do. Overall, 75% the Swedes surveyed expressed a strong or very strong identification with their neighborhood or town. However, those with commutes of one hour or longer expressed less local identification than those with shorter commutes. Categorically speaking, women expressed stronger local identification than men, and white-collar workers expressed less local identification than blue-collar workers.

Another interesting aspect of the study is the relationship between nationality and community identification. Gustafson notes that it has been commonly believed that immigrants, while initially feeling little sense of belonging to their adopted country, develop this sense over time as they assimilate into the new culture. He mentions, though, that recent studies show immigrants can retain identification with their nation of origin while also developing belonging to their new home. This relates to interesting issues regarding the impact of globalization.

Globalization and Commuting

These issues conveniently direct us towards considering the interplay between globalization and community. Commuters using public transportation, especially those in major metropolitan areas, often find themselves in a complex cultural mix ranging from local to global varieties. The daily routine of the commute, potentially hours spent in transit, contributes to what Bourdieu and others have referred to as habitus, one's cultural identity as formed through the participation in everyday activities. And as Sassen has pointed out in her writing about the continued relevance of the local, these interactions remain relevant in spite of a growing globalization. These metropolitan cultural mixes present opportunities for the exchange of ideas through subtle and conspicuous expressions – it would seem that commuting via public transportation in a Global City might be one locus in which a global cultural identity is fostered, despite what might seem to be an insignificant interaction. As a commuter on a bus, train, or subway in a large metropolitan area, there is inevitably some interaction with people of different economic, ethnic, career, political backgrounds from one's own. Simple things like the navigation of available space on a crowded subway car can make cultural differences apparent, what de Certeau might have called the rhetorics of space become apparent. How commuters negotiate their place in a crowded car, avoiding or displaying eye contact, helping one another to clarify confusing directions, offering seats to those who are standing … these casual interactions with strangers form cooperative bonds that, despite their brevity, are a platform for interaction that enables trust to formulate

However, despite these instances of trust, can we credit these moments, what Patricia Price has called 'pauses,' with nurturing a sort of global exchange, the sort that Sassen would have us believe takes place at the Manhattan sidewalk food vendor? [8] [9] There is some acceptance borne from familiarity that is fostered by these encounters with others; could these pauses be wrapped into the process of globalization? While this is the case on some level, it is likely not a simple scenario. In an interesting discussion about cultural influence and recalcitrance, Paul Kennedy points out that people often hold more tightly to their cultural heritage in the face of diversity, for this diversity can be interpreted as a threat: a threat to one's 'way of life,' to one's standard of living, and so on. This threat level, while manifested in people's anxieties about cultural differences, can be exacerbated by those who seek to benefit from manipulating people's fears, such as politicians and businesses. Perhaps the average commuter carries with

them a type of cultural vaccination that allows for a limited amount of multicultural engagement while at the same time holding fast to their own cultural identity.

The Political Economy of Commuting

Are commuter thoroughfares neutral entities created solely for the purposes of travel ease? Are they the result of a capitalistic hegemony that benefits from the atomization of the public and the resulting commerce? David Harvey, writing about the impact of Haussmann's Second Empire Parisian boulevards, notes that the restructuring of Paris not only affected the movement of the city's residents, but enabled greater control of the populace both physically and psychologically. The former through creating harder to obstruct passageways and providing better site lines for police; the latter by creating a 'stage' for commerce, leading to what Harvey refers to as 'governance by spectacle.' [10]In discussing the relationship between public space, spectacle, and political agency, Harvey (and he is not alone here) asserts that transforming public space into a site for spectacle depoliticizes that space, that the politics underlying public space are obscured for the sake of spectacle and the allied 'embourgeoisement'. What if anything does this critique have to do with the motorized 'boulevards' of current-day commuters?

It is without doubt that commuter thoroughfares (freeways, trains, subways) exist in large part due to the need of workers and goods to be transferred from point A to point B. That the design and direction of these thoroughfares are determined by people in power who have a range of vested interests, from getting materials to market to getting reelected, has been well considered by the likes of Harvey, Castells, Kennedy, and others. Aspects of transportation planning such as the transportation type, the location of routes, the location of access points, the cost for use, and so forth, have a tangible impact upon people's lives (commuting costs and real estate prices, for example) – it hits them in the wallet, so to speak.

But how does the commute function with regards to political activation or pacification? Is the routine of the commute one more element in the average person's life that vaporizes political agency? Or does it, despite its phenomenological banality (or perhaps because of it) refresh the commuter's sense of social connectedness, or even engagement? I am early yet in the process of recording commuters' stories, but what I've found is a disconnect between commuters' perceptions and their surroundings, be it people, nature, commerce, etc. Does this speak to the instrumental nature of commuting - its purpose being only to get 'there'? Could it be that commuters, while not conscious of social engagement, are in fact absorbing subtle cues from the environment, whether it is the freeway or the subway, and thereby gaining some awareness of their community?

Aside from the particulars of the commute, commuting provides a connection between home life and work life: it is a physical link between personal life and one's role in the national and international socio-political complex. And yet, due to the routine of commuting, and the immediate economic and lifestyle 'needs' that work provides for, this connection is often overlooked. Leading to the misguided notion that one's home life is disassociated from the larger geopolitics of global culture.

Changing Technology: Telecommuting and Community

With the rapid growth in mobile communication, the notion of physically commuting to and from work is no longer a given; telecommuting is a growing option for numerous occupations. Along with the increased flexibility this provides there is a change in how one's time is spent, who it is spent with, the

substance of what is communicated, and so on. As well, telecommuting has an effect on the social bonds that once were largely established within one's proximity, but are now increasingly distanced and mediated. The ways that we think about community, possibly even the way we envision our community, may be changing along with these changes in technology. For instance, one can imagine an older sense of community that was determined by location, and that might be visualized as an entity established around one's home, or one's job. Today we can envision a community that, rather than being cohesive and centered, is polymorphous and complex, has telematic tendrils connecting places that one may only visit sporadically, or never at all. This would seem to produce an atomization of community, but one could also argue that a new form of community is shaping up. This new community is emerging with our increasing use of communications technology. It is rhizomatic in nature and appearance, a parallel to our networked lives.

Conclusion and Sendoff

Commuting is one aspect of daily life that, due to its nature of traversing through territorial and cultural boundaries, and its inherent connection between home and work, the personal and the social, the local and the transnational, is full of possibilities for investigating a range of issues. Issues such as perceived community, the cross fertilization of cultures, the relationship between home, work, and the broader socio-political realm. With the help of commuters and the use of various methods, from low-tech to high-tech, for documenting their impressions of commuting and community, Perceptions of the Commuting Ethnogapher will provide insights into at least some of these areas of interest, and areas yet to be defined.

References and Notes:

1. *Saskia Sassen, Cities in a World Economy (Thousand Oaks, California: Pine Forge Press, 2000).*
2. *Robert Reich, Aftershock: The Next Economy and America's Future (New York: Vintage Books, 2010), 42.*
3. *Marcus Bowman, "U.S. Commuting Statistical Analysis - Presentation Transcript," IAC Transportation, July, 2008, http://www.slideshare.net/marcus.bowman.slides/us-commuting-statistical-analysis (accessed May 29, 2012).*
4. *Shin Lee, Jong Gook Seo, and Chris Webster. "The Decentralizing Metropolis: Economic Diversity and Commuting in the US Suburbs," in Urban Studies 43, no. 13 (2006): 2526.*
5. *Saskia Sassen, Cities in a World Economy (Thousand Oaks, California: Pine Forge Press, 2000), 18.*
6. *Pamela Shurmer-Smith, Doing Cultural Geography (Thousand Oaks, California: SAGE, 2002), 35.*
7. *Per Gustafson, "Mobility and Territorial Belonging," in Environment and Behavior 41, no. 4 (2009): 490–508.*
8. *Price, Patricia, "Cohering Culture on Calle Ocho: The Pause and Flow of Latindiad," in Globalizations 4, no. 1, 81-100 (2007) quoted in Paul Kennedy, Local Lives and Global Transformations: Towards World Society (New York: Palgrave MacMillan, 2010), 155.*
9. *Saskia Sassen, "Cityness in the Urban Age," Urban Age Bulletin, no. 2 (2005).*
10. *David Harvey's official Web Site, "The Political Economy of Public Space," 2006, http://davidharvey.org/media/public.pdf (accessed July 14, 2011).*

THE MEMORY AND THE CODE: THE PHANTASM OF DIGITAL CULTURE

Javier Toscano

The aim of this paper is to analyze the physical concatenation of technological devices, specifically between memory capacities and qualities (a database, an archive) and the code that regulates its performance. The code is here pursued as an "element" as concrete as an object, and with a specific cultural history (a code as a program, and in a wider realm, an ethos as a code).

Intro [1]

If man was one time the one that imposed his rhythm to objects, objects are nowadays the ones that impose their discontinuous rhythms to human beings, their discontinuous form to be there or substitute one another without becoming old. The status of a whole civilization changes according to the presence and use of everyday objects.

The system of objects

_Jean Baudrillard

We live in an epoch where, once a new technological device is created, we forget the use we had imagined for its predecessors. It is as if our memory of things was conditioned upon their presence. The lapse between the apparition of a new gadget and the moment we understand its implications for our world flees faster every time. But this holds no surprise, the oblivion of those implications is a calculated effect in the consumerist structure, one that operates more as a systemic constant than as a secret interest, and that derives from the daily iterative accumulation of all sorts and the saturated flux of current information. In a very practical and convenient manner, the erasure of meaning of our surroundings is organized as a veiling of a semantic matrix. The brief space of this paper would not allow us to go deep into its consequences and structure, we will concentrate instead in analyzing one way on which oblivion makes the new appear as the never-seen, while many times it is in fact a space-and-cost economical reelaboration of the ever-known. True invention will then appear as a case of its own, a rare species that reelaborates time and space, but one with which we would not have the occasion to deal with here. Hopefully, by signaling out what has been a recurrent practice in contemporary theoretical argot and conceptual paraphernalia, we can at least contribute to a re-organization of perspectives that sheds light upon the common fetishistic approaches around present-day technologies.

a. Language

One of the explicit forms by which the "new" is wrapped in spectacularity and sensationalism is with the sophisticated devices of neologism creation. Language accompanies every technological creation with a territorializing strategy that has an effect on an epoch's forms of expression. To address a specific issue in contemporary societies – based on an economy of the intangible – means to fulfill the destiny of a certain desire, and to orient specifically an act of consumption. To think about the technology of our

time, we need to think how it is being described, spoken about, how is it understood from, with, through the specific agents of its production and consumption, and how its capacities are evoked, its effects programmed, its thrusts referred. The technological production starts as a speech act in itself. A machine can be thought of as a statement that requests, demands, solicits or summons a user's mobilization, a specific use and deployment.

b. Memory

In any case, it would be an endless task to refer all the effects and affects that contemporary devices produce in our time. We could therefore concentrate on two structures whose incidence is ample and quite decisive at once. On the one side, we find memory, a capacity for retention, the stock of data over which technological devices are built upon. In our time, the notion that every technological device would be faster, fitter and more powerful the more data it can process has become a common association, may it be for a computer, a toaster or a car. But that is not all. The discourse on machinic memory has been overwritten on a distinct paradigm of human memory, the one set by John Locke – to be more precise – that has memory as the base for the identity of an individual. [2] This is nothing new – we presence again here descriptions on the new through what is already known. The problem is that the foundation of that analogy is utterly erroneous. With the latest findings we have come to know to a greater detail that human memory does not work as a mere receptacle of data (as the lockean ideal would put it), that it is equivocal – and that's where its creative capacity is rooted – and that more than speaking about memory like something man 'has', we should refer on how we operate as living conscious memories, dynamic and ever-receiving, that generate the materials needed for the projects that will end up building a common memory and a collective surrounding. In a few words, we can say that we are *perceptive memories*: we perceive from what we know, and this description is the one that fits best the *mnemonic experience.* [3]

The machinic memory behaves as a storehouse, but some relevant ongoing researches pretend to locate it and justify it as an enhanced human memory. The strongest trend in this direction has been that set by John McCarthy Gallagher, who came up with the expression "Artificial Intelligence" (AI) in 1956, from which the field of cognitive sciences has developed. Nowadays, there is a swarm of projects that ascribe themselves to the principles sketched by the AI trend. One of the most fecund and provocative is POEtic, an ongoing research that implies the development of a digital electronic circuit capable of integrating three biological models of self-organization: Philogenesis (P), Onogenesis (O), and Epigenesis (E). This circuit would conform a tissue that would become the fundamental strata for the creation of new machines based on this system, artifacts "capable of evolution, growth, self-repair, and learning" [4] according to its own creators. In other words, there is in this project, as in many similar ones, a supplanting of terms that always bring a reference and an imagined convergence with the natural sciences – mainly biology – and set the technological possibilities for a self-asserted avant-guard. But, to what extent is this only an excess of a rhetorical language? What is the fair measure for comparison? Should we remorselessly transpose the terms from one science to another, as if, for example, a human virus (a given form of 'life'), were the same as the virtual virus that apocalyptically spreads over ever-growing networks of servers and computers? There is a danger in the comparison, one that transcends the semantic field, but this is not a concern for the technology developers, who keep their tasks on target, encouraged by full-fledged 'efficientist' conquests on every field. The danger instead sprawls on the way we need to understand human intelligence and memory, beyond a computational paradigm. Briefly speak-

ing, we could say that human intelligence and memory are not describable as a series of ordered operations, but should be seen instead as emerging realities that could be transformed and affected by emotions, perception, experience and free will.

Memory as a term has to be acknowledged as a multilayered and context-related concept, the name for a capacity that is just not the same throughout species, and even less from human kind to its instrumental developments. While machinic memory is cumulative, human memory is safeguarding. The first complies with homogenization of data and neutralization of possibilities; it is materially restrained, and much formal in its display. It exists already on a world, to hold some of its data. On the other hand, human memory has remembering as only one of its functions. But thoroughly taken, human memory implies already a temporality, and above all, a world that is being built around it. Machinic memory is always external (no matter if it is inside a chassis), it contains information that is being quantified, encrypted, and therefore subdued; the data it holds is being con-formed as it is used, made ready to employ by any other application. Hence, it follows a container-model, and therefore the terminology that is used to describe its modulations: *formatting, compression, recovering, input, forward, zipping*, etc. Human memory, on the other hand, goes beyond the model of the container and contained, beyond the idea of a self-definitive capacity. [5] In this sense, individuals should be thought of as intersecting fields for remembrances, images, affections. Human memory is chiasmic, it builds traits 'inside', but operates 'outside', in the sense that it constructs sociality. The data it holds is productive in more than an organic sense: it can be only activated by contact with an *Other*. Machinic memories, formatting what they contain, deal with residues, incorporeal fragments: in the end machines cannot be held responsible, accountable, for what they contain. They are not 'faster', but only perform every time more rapidly what a human mind, responsible for its surroundings, has set them to do, in a calculated fashion.

This impossibility of covering over one function, one set of tasks, with another has, as we know, also implications that make the machinic memory achieve a performance that is usually not even sought after by the most sound of human memories. A given input, a plain given, cannot exist for the human memory, where every bit of information is instantly referred, inserted into a constellation of worldly fragments that dynamically signify it. Data exists as such only for the machine, a mere cipher is for them only a cipher and nothing else, and as such, it is already an entry that can be manipulated by a program (software or code) that allows for its recovery, its putting it forth, by its own means and terms (as we will see on the next section). Thus, human memory has not been 'upgraded' by the machinic memory; more likely, it implies a change of degree that comes here into question: the order of the archive plays now a substantial role, and pushes to a second plane the traits of human memory that do not allow for an efficient use of abstract input, now considered as 'immaterial resources' from where a surplus value can be extracted.

But how is machinic memory treated, accumulated and disposed of these days? What implications are derived from its form and use on the current technological surroundings? What is its reach? To tackle some of these questions, it will be important to turn into what makes the data stored in a simple box available, interpreted, and even shaped into operative forms with observable consequences in our current world.

c. Code

Code is the other structure that plays an important role in our current assumptions of media and technology. It is not only its definition that counts, but also its operative description throughout history. A

perspective that would have code as a notion pertaining exclusively to our time would be naïve: code is a cultural object – the cultural object *par excellance* – for every historical epoch, including ours. Code is the element around which the machinic memory is ordered, it is the precursor of technological events, the source for collective forms of inclusion and exclusion, the excuse for other devices of social resonance. But even if its importance can be clearly outlined, [6] not enough analysis have been developed on its cultural impact. We have not been trained on the importance of building algorithms, source codes and programs that would make us process alternate possibilities for other ways of being, distinct abilities for different ways of approaching the technified reality (and therefore our world), or new capabilities for the conception and constitution of information flows and archives (and their consequent implication for identity processes, historiography, narrativity and historical memory).

The more stable definition of code is the one that has it as a series of executable instructions. A primary approach would set it as a clear, distinct, constant, repeatable and productive object. But this does not take into account an old phantasm that inhabits its core, and which safeguards an old desire in Western history: to build something that has a life of its own, something that might spread without limits, without human control, transcending even the circumstances of its own creation. A historic research, which cannot be repeated in these pages, [7] would render the code as a logography that needs to be deciphered, an enigmatic cue that may be open only by those who have the key. Of course, this infuses the code with an auratic flair, which leaves it close at hand but inaccessible, far from evident. The code is a filter in front of which exclusions are being set. The code brings together communities, societies of interest and knowledge that gather exclusively, demandingly and disciplinarily around a cultural object, associating certain effects to it in a cultural ritual that performs those effects recursively – i. e. by ascribing them to the object in case.

But probably the trait that pertains more decisively to code is its repeatability. It is there that is operation is centered. This ability and demand to be repeated covers a pleasure principle that is unleashed in different epochs. Through this trait, a code can be assessed not as an object – and thus as a fetish – but more precisely as an *energeia*, [8] that ancient Greek term that tried to convey one stage of motion – something actual in the midst of becoming something else. And as an *energeia*, the code configures the everyday through, as, around, a set of cultural configurations. Its function is to disseminate and be disseminated; it is a spacing (as gaining a place) of meaning, or rather, a way for the hyposthasis of meaning. The code is an object-flux dispersing on, by, itself; it is the scattering of a contained force, a form of production that brings together efficiency and a promise, which rebounds in a production of symbolic forms.

By thinking on the ways language, memory and code are interrelated, we can anticipate the means by which algorithms and codes shape our relationship to information, and establish an array of operations from its flux. Nonetheless, the wide range of possibilities by which code transforms the data it uses as its basis – the entries archived –is yet to be assessed. When this data is held to represent crucial statistics or financial assets, strong walls of protection have been constructed to defend their form, to keep them intact. That yields some evidence upon the status assigned to that data. In the financial stage of capitalism, numbers and ciphers have become the new fetishistic category, and the algorithms used in banking operations and investment formats behave as the engines that speed up these numbers, making them advance, increase, take a share from another archive's data that then recedes, looses, decreases its face-'value'. The cluster of equations made possible by such codes is turned thus into a zero-sum operation.

When data is held to be historical information or identitary records, new historiographies and identity-creation concepts need to be developed, parameters that include the variable of technological configurations as a field of meaning. A wiki, for instance, can be thought of as a site where information can be conveniently shaped to fit a 'truth' by general opinion. A given fact gains such a status either when not many users are directly interested, or when other sources of information – conventional books most of the time – remain unquestioned. But wikis are leading the terrain in different forms of collective knowledge creation. The open code upon which they rely implies a certain epistemology, one that will leave its mark on our historical moment. Not surprisingly, the operation of a wiki remains an interesting topic in this sense, for if the manipulation of code can sensibly affect strategic data on a functional level (for example, on the determination of what constitutes a fact), we could raise questions on a historiographical, a technical, an esthetical, but most importantly, an ethico-political plane. In any case, the forms by which data is being transformed on its processing by code and algorithms are just about to start getting more importance. In the interrelations of the functions of machinic memory and the code that process it to make it available, we are witnesses to a very special moment, an epochal crossing of the technological and the conception of culture from which we can derive a more thorough understanding on the concrete possibilities for new forms of critical thinking, definitory behaviors and the collective creation of practical knowledge stemming out directly from our everyday interchanges with the world.

References and Notes:

1. *This papers works out the basic arguments of a more extended one: "La Memoria y el Código: Acceso y Producción de Sentido en la Era Digital" by Javier Toscano (CMM, México, 2009).*
2. *John Locke, An Essay Concerning Human Understanding (New York: Prometheus Books, 1995), 246-247.*
3. *The idea is not new. It is at the base of Henri Bergson's Matière et Mémoire (Paris: PUF, 1939), but also by more recent psychologists as Neisser, Norman, et. al., who explain perception as a process of analysis and synthesis, admitting therefore that memory has schemes of assimilation that allow for the analysis of stimuli, and some kind of mechanism that eschews hypothesis or anticipates what will be perceived. Cf. Neisser, Cognitive Psychology (Mexico: Trillas, 1995).*
4. *The POEtic Tissue Project, http://www.poetictissue.org (accessed March 1, 2011).*
5. *Edward Casey, Remembering, A Phenomenological Study (Bloomington: Indiana University Press, 2000), 243, 251.*
6. *For example: Mathew Fuller, Behind the Blip: Software as Culture (New York: Autonomedia, 2003).*
7. *Bibliography cited on note 1.*
8. *The classic discussion in Aristotle, Metaphysics, trans. W.D. Ross (Oxford: Clarendon Press, 1953), 9.8.1040b-1052a, ff.*

SKEDIOMATA: GUINEA PIG AND PERFORMER

Patrick Tresset, Frederic Fol Leymarie & Nanda Khaorapapong

We present Skediomata, a low cost robotic platform dedicated to drawing sketches. Skediomata is described both as a tool for research for the AIkon-II project and as a performer (in various embodiments) in art installations. We present a brief technical description of the system as well as a summary of two recent art installations where Skediomata was employed as a live performer.

Fig. 1, Installations with multiple Skediomatas (Paul and Pete), Tenderpixel, London, June 2011. Copyright Patrick Tresset.
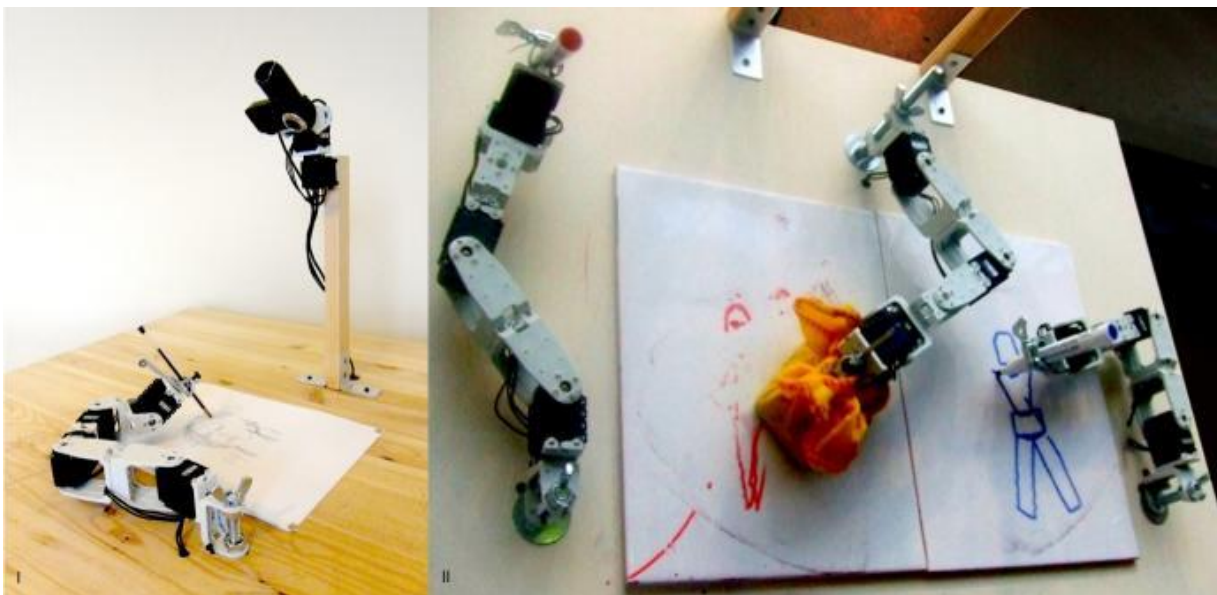
Fig. 2.I, Aikon pre-alpha at Kinetica Art Fair, London, February 2010. Copyright Patrick Tresset. 2.II Ladies and Gents at Watermans art centre, Copyright Nanda Khaorapapong.
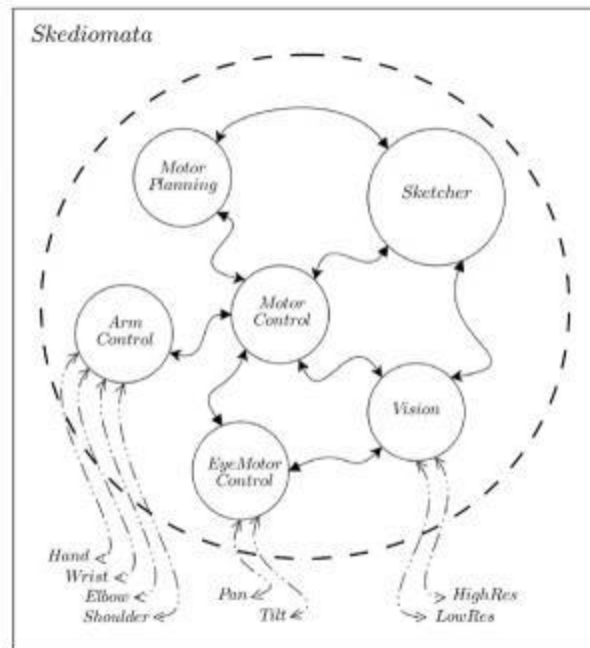
Fig. 3, Skediomata's architecture overview. Copyright Patrick Tresset.

Introduction

Skediomata, the robotic entity dedicated to the study of drawing was born in research as a guinea pig. Perhaps not surprisingly, it and its siblings have been found to be gifted leading performers when participating in art installations. The original Skediomata is being developed in the context of the AIkon-II research project, an investigation into sketching.

The AIkon-II main research objective is to gain a better understanding of the emergence of style in observational sketches. The methodology deployed to shed light on this complex activity consist of developing a computational model of the processes at play during the sketching cycle.

Interestingly, when designing a robot that interacts with physical reality, the issues encountered are of a very different nature than if the system is solely computational. It is one of the reasons that lead actors from the artificial intelligence community such as Rodney Brooks at the MIT [1] do consider that disembodied artificial intelligence is essentially flawed. Looking at drawing as a complex sensorimotor activity brings new insights into the processes we are investigating and into ways to model these. Furthermore, the type of software architecture that supports communications by distributed concurrently running processes as used in contemporary robotics is well adapted to the simulation of an activity such as sketching recognised has being the result of the interaction and cooperation of multiple processes [5].

Apart from being an essential and influencial "guinea pig" that furthers our research, due to the fascination that robots exerts on the public, Skediomata has proven to also be an excellent ambassador to promote AIkon-II's work. Furthermore due to its low cost and the type of software architecture developed, groups of Skediomatas feasibly collaborate as performers in art installations.

In this paper after a brief historical introduction of drawing machines and laying out possible avenues to explain the performative qualities of Skediomata, we present a comprehensive description of the Skediomata platform. We then describe two recent artistic installations presented in 2010 and hint at the future.

Drawing and Robots

There has been a long tradition of drawing automata or machines, which we can trace back to at least the 18th century, e.g., with Maillardet's automaton which was able to draw seven sketches and write four poems. Closer to us there are important links between the origin of computational art and drawing machines. The Algorists [2] who were pioneers of the field made extensive use of early drawing machines namely pen-plotters. A notable member of the group, Roman Verostko who was celebrated in 2009 by ACM Siggraph with the attribution of a prize honoring achievements in digital art, still uses pen-plotters. Although Harold Cohen has for some time now used large format ink printers as output for AARON, until the early nineties he used custom drawing/painting machines. Interestingly the first versions of AARON were using a drawing robot, a type of mechanical turtle that allowed for large scale drawings [3]. This early robot was performing live notably at Documenta 6, 1977, Kassel in Germany. From Cohen's descriptions we can recognise that the performative quality of the installation had a strong impact on the audience; an effect that later Cohen would judge distractive.

A drawing or even a sketch is made to be appreciated when finished. It is a static image. As often noted by artists, the process of drawing is a private intimate activity, seldomly intended to be shown. Often cited in the literature are the time, movement, process, intention, capturing the quality of the drawing activity. For the observer, the sketch is the trace of the gestures, the paths that the draughtsman's arm/body/hand has taken. It is a memory, a direct witness of the draugthsman's action. The manner in which traces lay on the paper, their positions, curvatures, harmonies or discordances, will influence the observer's perception. The recent discovery of the mirror neuron system (MNS) has lead Gallese and Freedberg [6] [4] to speculate that aesthetic experience in the viewer in front of an artwork can be explain through the MNS activity. Mirror neurons, found in the premotor area of the cortex, are activated when either performing an action or observing another individual performing the same action. The existence of mirror neurons would explain phenomena such as empathy, and reading intentionality. Interestingly, MNS activity could explain the strong effect some robotic art installations exert on audiences. For example, consider the fascination exercised by Edward Inhatowicz's Senster [9] or more recently Ricardo Nascimento's Suffering robot. In these installations there is no attempt at making the robot look organic; on the contrary their artificially is not hidden, their mechanisms are laid bare. It is only through their limbs' layouts, reactions and movements that the audiences feel empathy.

When we are exhibiting installations where Skediomata is a performer we are exploring on one hand the performative nature of drawing and on the other the perception the audience has of the artistic practice and the artist. We remain safely away from the uncanny valleys; Skediomata does not pretend to be human. It is only an obsessive drawing entity. It has eyes but no head. The arm's limited freedom makes it only able to trace or erase. Yet, it is displaying some form of attention when focussing on a person and some form of intention, as for tracing a line there is a need for intention. The presence of intention is even more striking if the action slightly fails, such as when the arm is attempting to draw a straight line but not managing to do it perfectly.

Technical Description

Skediomata is a robotic hand-eye system conceived to be used as a guinea pig for experimental research during our investigation into the processes involved when sketching faces. As such the general design objectives for the Skediomata system are to: a) fulfill some minimal requirements necessary for experimental research into the sketching activity, b) be suitable for public demonstration, c) be employed as a performer in art contexts. We are describing here the current version (at the time of writing, in January 2011).

ARM

The arm is conceived as a planar arm with an extra revolute joint allowing the vertical movement of the pen. Having 4 DOF brings the arm's architecture closer to a humanoid arm. This increased morphological proximity influences the observer's affective relation with the robot. To further increase the association with a human arm we have set the joint's angular limits in such a manner that the arm's freedom will resemble that of a human left or right arm.

The actuators used are Dynamixel AX-12 servos manufactured by Robotis. Each such servo includes an integrated 8 bit micro controller. The servos are addressed with an 8 bit ID that can be networked in a daisy chain. Commands are sent by writing some values in registers. Servos states (for feedback) are queried by reading values from registers. Commands include velocity, position, compliance, maximum load. Feedback includes position, velocity, load, voltage.

EYE

The camera system provides visual data about the sitter and feedback about the drawing gestures and sketching evolving results. These multiple functions entail different requirements: i) motor control to bring the focus either on the drawing or on the sitter, ii) precision to look at the sitter and drawing, iii) speed of capture to observe the hand drawing in real time. A pan and tilt system driven by two ax-12 actuators is used to control the focus of attention's (FOA) direction.

SOFTWARE

Contemporary robotic software architecture is based on communication between concurrent distributed processes. In recent years we have seen the development of open source robotic software frameworks such as ROS and YARP. These frameworks help organize communication between sensors, processors, and actuators. One of the advantages of these frameworks is that they facilitate components' reuse and have a large ecosystem of research teams that use these and publish new components that are reusable for other projects. Skediomata is currently using YARP as a framework. An overview of the Skediomata framework is presented in fig. 3. One of the advantages of this architecture is that depending on what Skediomata is used for, AIkon or as a performer, only the Sketcher's component is specific. Furthermore it is very easy two have multiple instances of the system running concurrently and communicating. Using YARP also provides a web interface that allows for the systems to be monitored and controlled remotely.

AIkon Pre-alpha

The AIkon pre-alpha version was exhibited for the first time at the Kinetica Art Fair held in London in early February 2010. The system drew over a hundred visitors' faces during the weekend, the role of the human operators (the authors) being reduced to mechanically changing the paper. The requirements we had set for the system in view of the exhibition was to have AIkon capable of autonomously do live face sketches of visitors (fig 1. and fig 2-I). Our approach is to have the system follow a strategy, method and manner as would be deployed by a human when sketching. In this instance, the manner in which the system produced sketches was inspired by the idea of approximately drawing the structural lines that could be used as initial steps in a more complete sketching cycle.

SKETCHING CYCLE OF AIKON-II PRE-ALPHA

1. Scan the environment by moving the eye until a face is detected. Uses the Haar feature detector that is part of the openCV library.
2. Focus the eye onto the sitter.
3. Limit the region of interest (ROI) to a close-up framing.
4. Segment figure/ground, simply by applying a flood fill algorithm, with seeds located at coordinates heuristically known to be ground.
5. Convert the ROI to gray levels.
6. Convolve the ROI with a difference of gaussian (DOG). Difference of gaussian are known to be a good approximation of the transformation that occurs in the human in the lateral geniculate nucleus (LGN).
7. Draw salient lines with increasing precision.
   o Convolve the image with a Gabor filter banks with diminishing spatial frequencies and tuned to an increasing number of orientations. Gabor filters are known to be a good approximation of simple receptive cells found in the human visual cortex V1 area [8]. Simple and complex cells in V1 are known to have peak excitation (firing rate) to lines with given orientation and high contrast [7].
   o Extract the stronger responses from the Gabor filter response images.
   o Compute the location and direction of straight lines corresponding to selected responses.
   o Point to point trajectory planning in the Cartesian space.
   o Resampling and transformation of the trajectory in the Joint space using analytic inverse kinematics.
   o Execute the gesture, sending the succession of Joint positions to the arm's servos controller.
8. Execute the signing script.
9. Human operator mechanically and boringly detaches the paper, gives it to the sitter and puts a new sheet of paper while AIkon cools down and waits for the next sitter.

Ladies and Gents at Unleashed Devices

Ladies and Gents was a site specific installation presented at the Unleashed devices exhibition, which was held in September and October 2010 at the Watermans Center in Brentford, London. The idea we developed then was in response to a promenade in the Watermans Center space. A problem with the AIkon installation as exhibited at Kinetica was that it required the presence of a human operator to act as a paper changer device. This was unsuitable for a two month long exhibit. So we decided to work on a site specific installation with the additional constraint of being wall-based, and to produce drawings in response to visitors' presence. The only suitable wall space we found was just in between the Ladies and Gents toilet entrance doors. This location provided inspiration for the piece. The wall based drawings

would echo the idea of graffiti as found in lavatories and the gender would provide guidance for the drawings.

Ladies & Gents is an installation employing three Skediomata performers acting respectively as Gent, Lady and Cleaner. Gent has an eye in the Gents lavatories, Lady an eye in the Ladies and Cleaner has two eyes watching the tiles that are located on the wall between the doors outside the lavatories, located in the center's ticket hall.

Every time a new person enters the public lavatory, some measures are extracted from the captured silhouette. Depending on which room the person is in, either Gent or Lady uses the gender-based measurement to create a somewhat humoristic graffiti. This grafitti is drawn either by Gent or Lady's arm on the tiles located under the Cleaner's eyes. As soon as a graffiti is finished, Cleaner wipes clean the tile, but Cleaner's eyes have previously captured the drawing process, in the form of a video being automatically compressed and uploaded to YouTube and posted on a dedicated blog.

Conclusions and Future

We have presented here Skediomata, a low cost versatile robotic platform used in a research context as well as in art installations. Each time a Skediomata systems was exhibited it attracted the public and press attention, which has enabled us to have a rather full program of commisions and exhibitions for 2011. Even if our focus is on the Aikon-II research project's objectives, the versatility of the Skediomata system allows us to take part in such public engagement activities. Over this coming year, we have planned for most of the work to be on the refinement of the AIkon-II core system, with for main objective to provide AIkon better capacities at using visual feedback to correct or modify a sketch in progress. We foresee that AIkon-II will be exhibited sometime in 2012.

References and Notes:

1. R. A. Brooks, "Elephants Don't Play Chess," in Robotics and Autonomous Systems 6, no. 1-2 (1990): 3-15.
2. L. Candy and E. Edmonds, Explorations in Art and Technology (London: Springer-Verlag, 2002).
3. H. Cohen, "What Is an Image," Proceedings of the International Conference on Artificial Intelligence (ICAI 1979), Tokyo, (1979): 34-46.
4. D. Freedberg and Vittorio Gallese, "Motion, Emotion and Empathy in Esthetic Experience," in Trends in Cognitive Sciences 11, no. 5 (2007): 197–203.
5. C. Frith and J. Law, "Cognitive and Physiological Processes Underlying Drawing Skills," in Leonardo 28, no. 3 (1990): 203-205.
6. V. Gallese and D. Freedberg, "Mirror and Canonical Neurons Are Crucial Elements in Easthetic Response, Mirror and Canonical Neurons Are Not Constitutive of Aesthetic Response," in Trends in Cognitive Sciences 11, no. 10 (2007): 411-412.
7. D.H. Hubel and T.N. Wiesel, "Receptive Fields of Single Neurons Is the Cat's Striate Cortex," in Journal of Physiology 148, no. 3 (1959): 574-591.
8. J. P. Jones and L. A. Palmer, "An Evaluation of the Two-dimensional Gabor Filter Model of Simple Receptive Fields in Cat Striate Cortex," in Journal of Neurophysiology 58, no. 6 (1987): 1233-1258.
9. E. Kac, "Origin and Development of Robotic Art," in Art Journal 56, no. 3 (1997): 60-67.

FROM « IMMATERIAL » TO « HYPERMATERIAL »

Colette Tron

In this proposal, it is submitted to approach the digital technologies through the question of their materiality. To do this, the references will be taken from theoretical and conceptual propositions by some French philosophers.

This paper would like to develop a sort of historical definition and conception of the new technologies of information through these philosophical concepts.

Catalog « Les immatériaux », cover pages, Centre Pompidou publications.

Introduction

By its use of the term, the exhibition entitled "Les immatériaux" / "The Immaterials" organized in the 80's under the conception of the philosopher Jean-François Lyotard at the Georges Pompidou Center seemed to define a new plasticity of art for the computer. "The material itself never ceases to become more complex [...] stipulates Lyotard. A color, a sound and material are restituted as precisely identifiable digital numbers […] the end result comes to us analyzed and reconstituted in complex formulas." [1]

Electronics, the digital and programs, all of which are components of the computer work together to create digital representation which we currently label immaterial.

Electronics with the rays that it emits, and its intangible physicality, computing and its digital base, the calculations it implements and the languages it manipulates participate in systems that are already symbols, hence abstractions. Thus we call the computer an abstract machine.

"Materials and digital tools are essentially symbolic and linguistic. These are what compose the language of computer programs" according to Hillaire and Couchot in "L'art numérique ou comment la technologie vient au monde de l'art" / "Digital art, or when technology comes to the art world." [2] They nevertheless go on to say "we can no longer consider them simply as immaterial "what marks digital technologies is not their immateriality but their programmability, in other words the fact that they are reduced to computer programs with a capacity to be processed by a computing machine". And despite the language or symbolic form that arises what is subjacent and allows the computer to function are automatically treated programs and data.

In addition, in computing and the digital we come face to face with the computer's double language, allowing the machine to operate, uphold representation and that of interface and surface, restituting symbols that we know and recognize, i.e. text, image and sound.

Whereas it is this chain of abstraction, this superposition of digital, programmatic and semiotic languages that work together to produce the immateriality of digital technologies. From bit, the 0 and the 1, the binary basis for the functioning of the digital system, to interface that renders the symbolic figure readable by way of the treatment of data by the computer program, the computer only manipulates abstract symbols. This interweaving links *techné* and *logos* and this techno-science gives rise to technology. Thus we find the immateriality of abstract machines occupying several layers.

The immateriality described above applies itself both to computers and to the abstraction of the languages flowing through it.

However through a reading of recent work by philosopher Bernard Stiegler entitled "Economie de l'hypermatériel et psychopouvoir / "Economy of hypermaterial and psychopower," [3] we discover a new way to ponder the developments of new technologies (via scientific research preceding them…) making their way into a hypermaterial reality. Stiegler describes the evolutions of technique, diverse periods of science, the emergence of techno-sciences and their transformation into technologies, their industrial economy and most especially he analyzes scientific terrain that he calls invisible "ranging from nanostructures to neurological foundations of the subconscious, including biotechnologies". He calls these invisible systems the terrain of the hypermaterial when, according to him, "material remains a form (consider the quantum level) and the form is always information in itself (that is to say a transitory state of substance produced by a material)"… This hypermateriality weaves its way through cultural and cognitive technologies and closely related technologies (biotechnology and nanotechnology) whose paths converge in the digital.

"The Immaterials", an Exhibition, a Concept

The exhibition "Les immateriaux" designed by the philosopher Jean-Francois Lyotard at the Georges Pompidou Center seemed to define through this term, first a new plasticity of art for the computer, as well as new Information Technology.

Now a key point of reference in the evolution and a definite revelation, at least concerning France, of art using new technologies, especially via electronics, computers and obviously programming, this exhibition and its title announced the coming of an immaterial art, in flux, impalpable and was a precursor in the analysis of the mutations for our senses, our sensibilities and meaning, adding significant perception to messages sent and received in the framework of these new technical mediums.

Indeed, the term "immaterials", he tells us, was chosen for two main reasons.

Message and medium, or material, are considered to be integral parts of one another, especially in the framework of technologies where "a code itself is inscribed in the medium" and is even part of the material itself. Substance or matter which, given the complexity of the elements behind its functioning have been relegated to the function of medium as a "model of language", for outside its physical elements, the computing machine merely manipulates abstract languages that link together to reproduce marked and significant symbols for our use.

The second reason for this terminology is linked to a change of scale initiated by this techno-science: "the infinitely small" is no longer confined to human scale and the new sciences that evolve from these new values have an influence upon artistic experimentation.

For Jean-François Lyotard and his collaborators, these parameters generate a questioning on the part of human beings and shake up the foundations of modernity that have been established in the 20th century's culture since the Age of Enlightenment. A "notion of the complexity of things" has provoked these questions, contextualizing and making concrete this "post-modernity" announced by Lyotard.

This complexity alone made it vital to seek answers about messages of reality and its references. An ontological approach? A structural approach? A scientific approach? Whichever the case, it is an issue of going beyond appearances and understanding what was taking place at the source. In the organisms and material themselves. And Lyotard probes this, examining and analyzing to get to the roots of "the birth of meaning" and seeks "the source of these messages", conveyed by the new mediums of electronics and computing.

Indeed, the main line of reasoning behind the exhibition "The Immaterials" was built upon the idea that "the materials themselves become more and more complex. When their brains began operating with digitalized information without analogy to their source this was a great step forward."

Here an analogical system is compared to a digital system: for the analog signal the medium of restitution of representation still has a reference point even if it is absent. In the digital system the real model no longer exists: it has been digitalized and renders representation totally abstract. "It is as if a filter had been established between things and us, a screen of numbers, he goes on to say. A color, a sound, material, pain or a star are all sent back to us as very precise digital numbers of identification."

It is the "language model" Lyotard evokes, replacing material which will transform reality in such a way that "the material itself comes to us analyzed and reconstituted in complex formulas" when "reality is composed of indiscernible elements" because "organized by laws of structure (matrix)". All this, he concludes "constructed upon disproportionate scales of space and time for humans".

Here, structure becomes texture and web and this "immateriality" born from a complexity we merely glimpse leaves behind it a Cartesian approach to the world. Is the deciphering of meaning a revelation? Can we find ways to reign it in? The Immaterials examined the drastic change that surfaced as we move from modernity to post-modernity, as we tackle the problematic of mastering material.

Digital Art

What is the digital and accordingly, what is digital art?

How does the digital influence art?

These subjects have already been tackled by Jean-François Lyotard, as he studied computers and their digital functioning, computer languages and replaced "pure material" with numbers, erasing source material. Superimposing languages of different registers, substituting matter with algorithm, altering the model by graphics and calculation, digital art is a product of these systems of languages, all abstractions that are interconnected between reality and its digital representation.

In their book "L'art numérique, ou comment la technologie vient au monde de l'art" published in 2003, the artist Edmond Couchot and the philosopher Norbert Hillaire develop their viewpoint on digital technologies, stating that "we can no longer consider them as simply "immaterial" because while the objects they produce are virtual, they are a significant part of the real world and have a definite influence on our senses".

No matter how we view virtual reality, or the essence of virtual artwork, it is important to stop and consider their technological mode of production or what we could call technique; this is what Edmond Couchot and Norbert Hillaire ascertain when they point out that science and art have found a new way to articulate through the digital. Indeed, they are of the opinion that "materials and digital tools are essentially symbolic and linguistic", functioning with abstraction and symbols that "stem from the language of computer programs".

For Couchot and Hillaire, "the specificity of digital technologies lies not in their immateriality but their programmability, which implies they have been reduced to computer programs capable of being automatically processed by the computing machine."

What becomes obvious first in Jean-François Lyotard"s analysis and then in the work of Edmond Couchot and Norbert Hillaire despite the results they obtain, resides in the relationship between technique and art, language and representation. Thus we discover that computer technology modifies the "texture" of artwork produced by computer or digital art, technology without which the work would be inexistent since it is encoded.

How do we seize upon the implications of digital art?

Couchot and Hillaire demonstrate early on that their terminology brushes aside "New Technologies of Information and Communication" in favor of "digital technologies" adeptly referring to their specificity. Technology rather than technique is an indication of the technical development of the science from which these are a product in terms of a system and its "formal reasoning", a regular and methodic functioning that attains logos, or an internal logic.

The works that evolve thanks to these digital technologies "share two common characteristics"; they are generated from the automatic calculations of computers and are adept at interacting with their creator or the intended user. Hence they are noteworthy for their programmability and interactivity. What Couchot and Hillaire would like to stress is that "the processes of fabrication that build the work" "are no longer physical but "computational and language based". Lyotard said the same thing using different words. But the latter all insist upon the role played by scientific modalities in digital computers. Their

programming activity is based on "logical models and mathematics from science". Sciences that use reality as a model in order to capture it and then reconstitute it. And this is accomplished by simulation. "Digital technologies are for the most part technologies of simulation" add Couchot and Hilaire.

Therefore digital simulation and its mathematical models are the underlying elements of representation. "Because of the digital, science cannot be interpreted metaphorically", rather "it asserts itself directly upon art by way of models of simulation, materials, tools and more importantly its processes".

We can consider the digital as a new state of representation, tied to a form of technique. Herein we are exposed to another approach to the complexity of the digital.

States of Material, or a Reason for the Hypermaterial

While Jean-François Lyotard considered material as a state of energy, and energy as being immaterial Bernard Stiegler's analysis took on a new approach with regards to science and technologies and their potential, "technologies of information, communication and cultural and cognitive technologies." by situating them in "hypermaterial devices", when the notion of information is offered up as an invisible yet omnipresent material.

"There is nothing that is not a material state", says Bernard Stiegler. And so for this philosopher, ""the immaterial" does not exist, not even in the nanometric dimension.

"States of evanescent material" remain material nonetheless. He foresees a situation of hypermateriality for our era and our economy. "I call hypermaterial a network of energy and information where there is no longer a distinction between material and its form – as we find in quantum mechanics", he explains, "and I label a process as being *hypermaterial* when information – presenting itself as form – is in reality a succession of states of material produced by materials, apparatuses, and techno-logical devices when the division between material and form is totally devoid of meaning". In reality "this is proof not of dematerialization but on the contrary, of hypermaterialization: all is transformed into information, or states of material through the intermediary of material and apparatuses which are instantaneously manageable and controllable "in the infinitesimal and the infinitely brief."

The only way to understand this concept or consider hypermateriality is to move beyond the out-dated differentiation between matter and form and acknowledge the state of the nanoworld. When matter becomes invisible and consequently "the problem is not one of immateriality, but the *invisibility* of matter". And we cannot comprehend the notion of such widespread information without keeping in mind that it is transformed matter, which is to say the product of other states of material, compiled in the digital and its mediums, or in the words of Bernard Stiegler, grammatize it by a process of discretisation, shifting from one form of material to another until matter and form merge. A process of discretisation that he reminds us has existed since the Upper Paleolithic from the sharpened flint to the digital and IPV6 and where it is always a question of mental processes that perform like engrams, because inscribed, encoded, memorized through materials, techniques and representations.

As such, in an analysis of formation and components of matter and a reformulation regarding information (its substance, its texture), hypermateriality takes on a definite consistency : "it is a state of transitory matter, in movement, a process which is always *up-to-date*, impossible to analyze simply, as either matter or as form. It is energy and information." Bernard Stiegler goes on to say that on the nanometric

scale there is really no reason to distinguish between the information industry and the industry of matter.

Bernard Stiegler's objective is not to refute the idea of the "immaterial" but rather the so-called economy of the immaterial which would ignore the possibilities of this new mode of production and transformation of matter, that of digital information (ranging from nanotechnologies to biotechnologies), whose encoding presently represents "colossal possibilities" which stretch beyond "the number of atoms on earth".

He is wary of a hyperindustrial society, capable of an infinitesimal accumulation of computer memory (data of every sort and their meta-data), within the confines of these technologies of the hypermaterial. His critique is founded upon the perspective of a "non-inhumane" future for humanity, a world Jean-François Lyotard had already described as being on an inhumane scale twenty-five years ago.

References and Notes:

1. *J. F. Lyotard, Les immatériaux - Catalog (Paris: Centre Georges Pompidou, 1985).*
2. *E. Couchot, and N. Hillaire, L'Art Numérique ou Comment la Technologie Vient au Monde de l'Art (Paris: Flammarion, 2003).*
3. *B. Stiegler, Economie de l'Hypermatériel et Psychopouvoir (Paris: Mille et une Nuits, 2009).*

TRANSFORMING THE PHYSICALITY OF EMOTION

Joan Truckenbrod

Where do emotions reside? Are they the sole property of the body or do they resonate in the interstitial spaces between the material world and ephemeral realms? I propose that emotions reside in the object, physical and virtual. In my artwork, I juxtapose objects with video projection. The object maintains a powerful reference with a cultural and social meaning, while multiple video projections intervene.
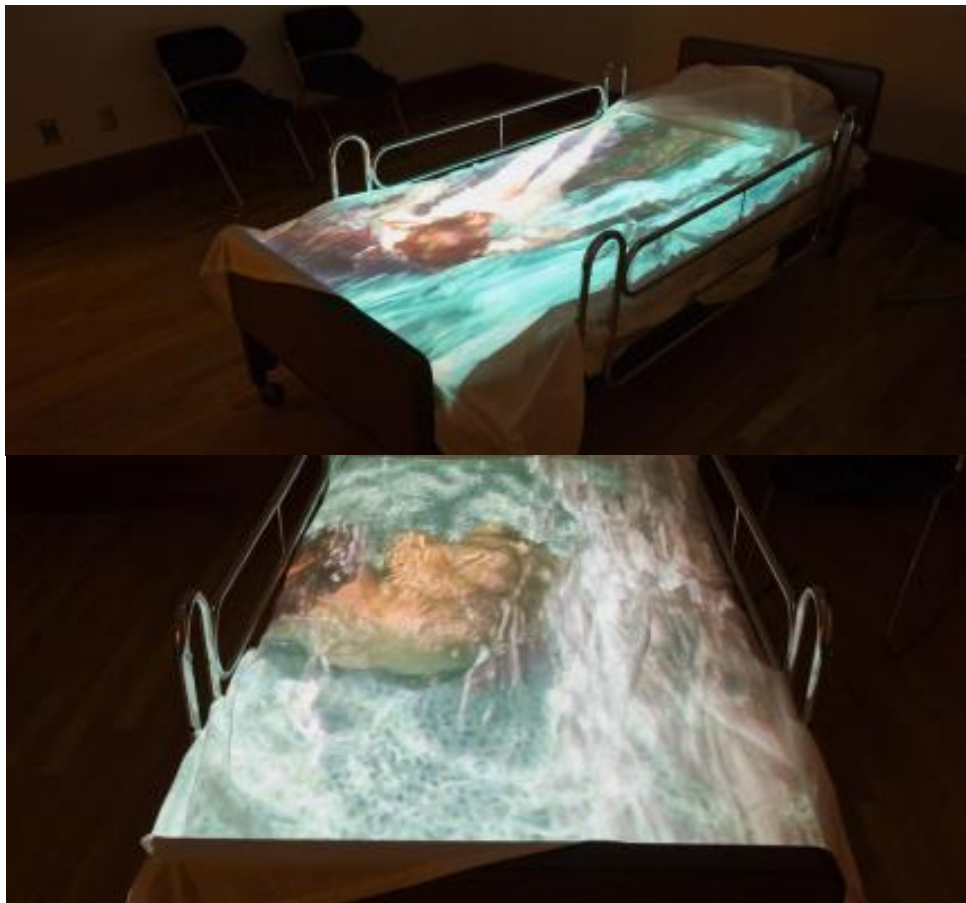
Against the Current, Joan Truckenbrod, Video/Multimedia Installation, Full Size Hospital Bed with Video Projection of Body Tumbling in Stream with Salmon Run, Sound. Copyright Joan Truckenbrod.

Where do emotions reside? Are they the sole property of the body or do they resonate in the interstitial spaces between the material world and ephemeral realms; in invisible but palpable electronic spaces, in virtuality, in spiritual and ancestral realms in indigenous cultures?

Developing research in affective computing aspires to create computing devices that embody emotions, - recognizing and responding to emotions expressed in people's faces, gestures and stances. Emotion is

fundamental to human experience, influencing cognition, perception, and everyday tasks such as learning, communication, and even rational decision-making. In the field of *Emotion Design* can we instigate spontaneous emotions? Is there an electronic mimesis that can empathize with the user?

The physical body is not the sole proprietor of emotions, rather, they reside in objects.Emotions emanate from the material world. Objects are imbued with power - "thing power" as described by Jane Bennett in her book *Vibrant Matter.* She proposes that objects embody a vibrancy of their own. Not only do they display or have *meaning*, they are active in creating the context of that meaning. They have agency in their behavior. Materiality is expressive. The efficacy of objects is in relation to the meaning they express. "Things" have a capacity to impede or bloc the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own. *Thingness* is not a fixed stability of materiality or a passive object, rather, she theorizes that materiality is as much a force as entity, as much energy as matter, as much intensity as extension. [1]

Demonstrating the vibrancy and power of materiality, my video sculpture is the collaboration of a charged object with time-based digital video imagery projected into the object. As video is nomadic, transitory, itinerant and even entropic, the juxtaposition of video with sculptural object is an active collaboration of the cultural or social meaning embedded in the object, with the animated imagery. Carried on the light of the digital video, the narrative intervenes in the meaning of the object. The digital theatrics of video sculpture engage objects as actants with a vital impetus – never acting alone. Their efficacy or agency always resonates in a collaboration, or in this case a collision, as objects are actors in this theatre of art installations. [2]

Objects Embedded With Memories

The potency of the material culture (materiality) emanates from memories embedded in and evoked by objects. Objects become sites of memory. Memory is intimately connected to our material culture. In the book "Memory Work: Archeologies of Material Practice" memory work refers to both the social practices that create memories and the materiality of memory making. Personal events and activities leave behind remnants or vestiges of social practices, that become infused with memories. Another example are the highly charged material fragments deposited by ritual and ceremony in indigenous cultures. Memory resides in these material traces, evoking strong emotions long after the performance of the ritual. In archeological research, objects uncovered provide insight into social and cultural practices, as they are traces of deposits left by these material practices. Memories of these practices are embedded in archeological objects which create contexts in which memory is materialized. The same is true for contemporary objects that embody memories of histories or practices. Materiality becomes a portal to understanding the connections between people through time, and diverse geographic locations. [3]

Resonances of memories are evoked in my video/multimedia installations. In the installation titled "Lightening in My Blood" the *object* is a large cardboard playhouse painted white - imbued with childhood memories of spontaneous narratives erupting in make-believe spaces. This *house* is placed on a small pedestal with wheels on the sides –giving the contradictory impression that the house is mobile. One side of the house glows with the fast paced video of baby salmon obsessively jumping at a grille trying to escape, in a fish hatchery in Oregon. This imagery mirrors the underlying emotions of participants in the video on the opposite side of this house – a slow walk through a nursing home captured from a wheel chair. The inaccessible inside of the house remains empty filled with an uncomfortable darkness, except for the fragments of video that push through the small cut-out windows. The sound of

gushing water fills the space. This potency of the material cultural emanates from memories embedded in, and evoked by, objects such as this playhouse. [4] Objects as sites of memory, construct personal emotional landscapes.

Emotions are sited in objects as memories become embedded in them. Artifacts carry the remembrance of events, the history, the power of an event such as trophies, plaques, certificates, as well as baby blankets or stuffed animals from childhood. Emotionality is active in objects through the memories they possess. The installation "Against the Current" employs the highly charged object of a hospital bed with the railings up, occupied by a body tumbling in a steam with a salmon run. (See Figure 1.) Emotionality is palpable as the nude body twists and turns in the water, as salmon swim upstream, against the current. See Figure 2. Salmon create a powerful metaphor as they are born in fresh water, and swim downstream and into the ocean as they mature with the radical shift in their environment from fresh water to salt water. Years later they return to this same stream, swimming upstream against the current to return to the lake of their birth. During this journey their powerful bodies propel them up the falls in the river. The timing of this return is for them to spawn, which jarringly is followed by their death. This installation exemplifies physical things that are employed to signify ephemeral events, virtual experiences or spiritual rituals. [2] They become signifiers for complex concepts.The physicality of emotions embedded in these objects is transformed into ephemeral, virtual or spiritual experiences through on-line societies, virtual relationships or spiritual experiences.

Agency of Objects

They are *animate* and possess agency, as objects are actants with a vital impetus – never acting alone. Objects are *animate* and possess agency, as they are actants with a vital impetus – never acting alone. Artifacts cause actions and their effects have consequences. Their efficacy or agency always depends on collaboration with other objects and people. In indigenous cultures there are numerous ritual and sacred objects that *possess* agency. A provocative object in African culture is the *Power Figure*, imbued with spiritual power by a ritual specialist. They operate with different functions such as healing, divination or protection. These unique sculptures are thought to have their own identities, and are treated with great respect because of the power they possess. Secret compartments within these objects contain special ingredients empowered to carry out their functions. These figures frequently are constructed with mirrors positioned on their stomachs, which become the eyes of the figure, enabling them to "see into the spiritual realm". Highly charged objects are an integral aspect of indigenous cultures. Emotions reside in these objects and are catalyzed in the interstitial spaces between the objects, shaman, and citizens during ritual performances and ceremonies.

'Machinic Assemblage'

The object is neither subject or object as in the grammar of a sentence but rather a participant in a *mosaic* or an assemblage which is comprised of heterogeneous elements. Emotions reside in multiple realms, in the interstitial spaces of assemblages of diverse elements. DeLeuze describes this synthesis of heterogeneities, an acculturation of diverse elements, as machinic assemblag*e*. [5] According to Bennett, machinic assemblage becomes a body that is multiple, with objects functioning in assemblage, in a mosaic. Mosaicism links the degree of internal diversity to the degree of power possessed by the thing. The agency of assemblages is the sharing of powers between artifacts, or people and artifacts, and the tendency to operate in dissonant conjunction with each other. Assemblages owe their agentic capacity to the vitality of materials that constitute it. [1]

An exhibition titled Machinic Alliances at Danniell Arnaud Contemporary Art Gallery in London in the summer of 2008, examines the issue of 'machinic' as a process that expresses our capacity as humans to form alliances with non-human forces, be they animal, insect, plant or virus. The exhibition takes this Deleuzian premise as the basis from which to propose unholy affiliations between categories of human/animal/technological.

Digital Art and Design

Nonobjectness is the focus of the Design firm named Nonobject Studio created by Branko Lukic with the objective of bringing meaning to otherwise unremarkable objects by creating emotional links to them. Engaging the idea of the agency of objects, they employ the power of emotions to activate and invigorate objects they design. Objects are designed and empowered, based on emotional references embedded in them. [6]

An iPhone app was invented by Alicia Morga to tracking emotions, for the purpose of managing one's emotions. The user inputs their evaluation or interpretation of their own emotional states. The app allows the user to track their emotional responses in order to become more aware of one's feelings and control them. The implication being that one's emotions are transferred to the iPhone.

Art exhibitions are also probing the site of emotions. The exhibition *Talking to Objects*, currently at MOMA in New York City, examines what is necessary to develop machines/objects that communicate their use and process for interaction to the user. The resonance of responses reside in this interstitial space between the user and the object. A previous exhibition at the New Museum in New York was titled *Free* exploring the Internet as a public art space. One artwork in this digital exhibition was a virtual exhibition of objects titled "School of Objects Criticized" by Alexandre Singh in which he located ordinary object positioned on spot-lighted pedestals. He transformed these toys and household items into characters performing a lively comedy of manners.

In my video sculpture, video projection and object collide or collaborate in creating a hybrid with the power and provocation arising out of the assemblage of diverse elements. Dynamic force, power emanates from the spactio-temperal configuration rather than from either participant. There is a combustion of the interstitial forces.

Contemporary theory migrates emotion from the physicality of the body to objects – both in the material world and the digital realm. The assemblage of emotional resonances are highly complex networks entangling people with objects collaborating in virtual and ephemeral experiences across cultures. Examples are "Vigilant things" created as powerful protectors in Yoruba culture. Amazing constructions involving ordinary materials such as string, paper and sticks, are described as "ase-impregnated sculptural constructs". A battered black plastic bag filed with a potent substance, tied and hung from a stick over a pile of recently cut green branches, signifies ownership. Anyone who steals these branches is warned and will "suffer some calamity". There are invisible potencies embedded in these protective constructions called "aale" that protect property and objects. These aale, even though they are constructed with ordinary objects like cloth and branches, *contain* and emit strong emotional resonances. [7]

The Chinese tradition of 'shi' is another example of the emotionality and agency embedded in objects. This concept of "shi" embodies the idea of congregational agency in which an assemblage owes its

agentic capabilities to the vitality of materials that constitute it. The shi of an assemblage is vibratory. The potential of this assemblage originates not in human initiatives but instead results from the very disposition of things. "Shi" is the style, energy, propensity, trajectory or élan inherent in a specific arrangement of things.

The material agency of assemblages is the sharing of powers between artifacts, or people and artifacts, and the tendency to operate in dissonant conjunction with each other. The assemblage owes its agentic capacity to the vitality of materials that constitute it.

Emotions have migrated from the physicality of the body, facial expressions, gestures, and posturing to the evocative resonances embedded in objects, and in the interstitial spaces between the body and objects. The digital realm has transformed the experience of affect into virtual and ephemeral territory, reawakening the emotional power of invisible potencies of objects in diverse cultures.

References and Notes:

1. *Jane Bennett, Vibrant Matter: A Political Ecology of Things (Durham-London: Duke University Press, 2010).*
2. *Joan Truckenbrod, The Paradoxical Object: Video Sculpture (London: Black Dog Publishers, forthcoming).*
3. *Barbara J. Mills and William H. Walker, Memory Work: Archaeologies of Material Practices (Santa Fe: School for Advanced Research Press, 2008).*
4. *Joan Truckenbrod, "Video Sculpture Lecture", (paper presented at the International Sculpture Conference, London, April 7-9, 2010).*
5. *Lawrence Grossberg, "Affect's Future: Rediscovering the Virtual in the Actural," in The Affect Theory Reader, eds. Melissan & Gregory Seigworth, 309-338 (Durham and London: Duke University Press, 2010).*
6. *Branko Lukic, Barry M. Katz and Bill Moggridge, Nonobject (Cambridge, MA: MIT Press, 2011).*
7. *David T. Doris, Vigilant Things, On Theives, Yoruba Anti-Aesthetics, and the Strange Fate of Ordinary Objects (Seattle-London: University of Washington Press, 2011).*

INTERSECTIONS OF INTERDISCIPLINARITY: TECHNOLOGICAL, TRANSNATIONAL AND FEMINIST FORMATIONS IN THE PUBLIC ELECTRONIC ART OF MURIEL MAGENTA

Tanfer Emin Tunc

This essay explores not only Magenta's personal and political causes as a transnational academic feminist, but also the ways in which her public electronic art has served as a forum for the intersection of technology, social critique, and women's issues.

A Professor of Art at Arizona State University, Tempe, a new genre artist who works with numerous technological media, and a dedicated proponent of the American women's art movement, Muriel Magenta (1932–) is the embodiment of not only interdisciplinarity but also of feminist transnational public art. A native New Yorker who was trained at Queens College (NY), Arizona State University, Tempe, and Johns Hopkins University, she has spent her career exploring the interface between art, science and technology, while remaining true to her larger objective of "creating a visual experience in an actual space, and then transmitting it over electronic networks into virtual environments," which are, due to her use of the Internet, both public and transnational [1].   Another goal of her digital art is to carve a space for women within this male-dominated genre. To that end, she has served as the President of the national Women's Caucus for Art, contributed to the College Art Association's Committee on Women in the Arts, and participated in public global gatherings, such as the United Nations World Conference on Women in Beijing, China (1995), where she presented *The World's Women On-Line!*, a transnational web database Magenta created and curated.

This essay will explore not only Magenta's personal and political causes as a transnational academic feminist, but also the ways in which her public electronic art has served as a forum for the intersection of technology, social critique, and women's issues. Focusing on her most prominent works, such as *Coiffure Carnival Trilogy* (1990), *Token City* (1997), *Times Square* (2002), *Club M: Avatars* (2007), and *Hot "Az" Hell* (2008), it will examine how Magenta's public art has addressed the challenges of globalization and transnationalism, and dissect the social critique her feminist digital art has posited since the 1990s. Moreover, it will elucidate the ideological underpinnings of Magenta's contributions to the digital art world, as well as her "activism through electronic art," both nationally and transnationally, by focusing on her work with the WCA, WWOL, and her Internet Art Workshop (2002/2004) at the YWCA Haven House (Phoenix, AZ), which yielded the documentary *28 Women: A Chance for Independence* (2005).

Muriel Magenta (née Gellert) has been producing art as a vocal member of the women's art movement since the 1960s and is known for her signature color magenta which she wears and uses in all of her creative work. However, her profile as a public electronic artist became more prominent in the 1990s after advances in computer technology and the advent of the Internet provided her with the tools necessary to express herself transnationally through her installations, interactive graphic displays, and short videos. One of the first works she produced as a result of these technological changes was *Coiffure Carnival Trilogy* (1990), a three part video/sculpture installation which incorporates computer graphics; specifically, the work *Patio de la Pompadour* which includes a cascade of multicolored androgynous

heads sporting exaggerated pompadour hairstyles, juxtaposed over a checkered disco floor and a magenta Cleopatra image whose hair resembles the Coliseum in Rome. Overall, *Coiffure Carnival Trilogy* is a satire of the power of hair in contemporary society, both as a capitalist industry which defines masculinity and femininity and as a vehicle for the construction of "self-image through hairstyle." It is comprised of three works - *In Defense of a Hairdo*, a giant pompadour sculpture, surrounded by fencing and concertina wire, and made of hair-like fibers; *Salon Doo*, a series of images depicting hairstyles since antiquity; and *Coiffure Carnival*, a short video tracing the literal and figurative "struggle" between humankind and hair and the "influence of hairstyle in art, history, and art history." Through numerous vignettes, this installation piece conveys the absurdity of hair, which becomes a transnational, transcultural and transhistorical "indicator of power, youth, and sexuality for both men and women" [2].

As Magenta has conveyed, "the trilogy addresses the quest for ideal beauty, as dictated by popular culture and driven by the stimulus of media 'Image Makers.' [It] speaks to styling one's hair as an aesthetic act. We create a work of art, a sculpture, as we stand in front of the mirror each morning, making sure that it works from all angles: top, sides, front and back…[Thus] the trilogy is a tongue-in-cheek look at society's obsession with the hairdo. It is a spoof on our pre-occupation with self-image as pure vanity" [3]. *In Defense of a Hairdo,* for example, is a "monumental, totemic icon to hairstyle" that juxtaposes both the sacred and the profane: "It's like a big, pagan idol. It's on wheels like something they would pull down the street." Even though the sculpture is a tribute to absurdity, Magenta simultaneously defends the notion that hair is also a palate for self-expression, creativity, and originality, and that it should be protected against the enemies of culture and individuality [4]. Implicit in the trilogy, however, is an indictment of the presupposed relationship between hair and gender. Although society has traditionally associated hair with women, especially in literature, mythology and popular culture (Medusa and Rapunzel), as Magenta illustrates through *Coiffure Carnival Trilogy,*it has also been an obsession of men, ranging from the flowing locks of the biblical Samson, to Louis XIV and his wigs, to Elvis Presley and his over-the-top stage presence, to drag queens. Hair, she suggests, like gender, is a daily performative act that involves staging, artifice and, above all, participating in multi-billion dollar global industry which traces its roots to the ancients. Thus hair, as part of the unattainable ideal of human beauty, is not just a concern for women but also an indelible element of masculinity.

Token City (1997) marks a turning point in Magenta's career in that the works since the debut of this electronic installation piece share a distinct urban, cosmopolitan, and multicultural dimension. *Token City* is essentially a four minute electronic representation of a New York City subway station that depicts the sights, sounds, and even scents of the world-famous public transportation system through real-time recoded footage of riders mixed with a 3-D computer animated subway station. A collaborative work with composer and percussionist Michael Udow, who recreates the subterranean sounds of the subway - past, present and future - by weaving a mixture of actual noises with electronic and multicultural musical elements to reflect the wide-range of subway riders, *Token City* is a multimedia work of virtual reality or "digital time travel" that uses computer graphics to "transform the everyday commute into an experience of images and sounds that simulates [the subway experience]. The viewer is immersed in a situation where emotions and thoughts associated with the subway are implied and heightened: the anonymity of the individual within the crowd, the anticipation of the unknown, [and] the passing of time." Viewers enter a subway platform that replicates riders' experiences and once again juxtaposes the sacred and profane elements found in urban street culture, such as exquisitely detailed mosaics and gum on the walls. Thus, *Token City* essentially transforms "the everyday commute into an experience that merges reality with the extraordinary" [5]. As Magenta elucidates, *Token City* was inspired by her own childhood experiences: "I actually spent all my time until I was about 20 years old in New York….I traveled to school on the subway…and I always used the subway as a place to sort of think and get my

system together as the subway system seemed to unfold itself. So I was very aware of the subway as a place, as a site, as an institution in my life, so to speak…I was always very fond of the mosaics and all the art that I saw in the subway. I was very observant of all the details, so it just sort of went into my consciousness" [6].

The 1997 opening reception of *Token City* at the Arizona State University Art Museum also had the added element of smell - specifically that of urine - which was meant to add to the virtual subway experience by injecting a "whiff of reality." In a parallel project called *Actual Odor*, "a Two-Hour Guerilla Performance," artist Angela Ellsworth "wore a jersey cocktail dress soaked in her own urine for the duration of the opening reception…to demonstrate how smell destroys any social boundaries existent in a subway, as it permeates the space and transcends visual barriers or experiences." As Ellsworth describes, "For six days prior to the event the dress soaked. On the seventh day the dress was hung out in 110 degree weather to dry." While wearing the dress, she fanned herself, "spreading the odor with a hand fan, one side of which was lettered with the word 'actual' and the other side with the word 'odor.' Ellsworth mingled with other museum visitors and for continuous periods of time sat in the projection space of Token City."   At other times, "she positioned herself under hot spot lights in order to generate more heat from her body for the utmost odor." While "most of the visitors could smell the unpleasant odor, [they] did not associate the nicely dressed woman with the smell, nor could they find the source of the scent," probably because femininity, as Ellsworth suggests, is still not associated with "actual odor" [7]. Thus Ellsworth's performance piece responded to *Token City* not only by questioning socially constructed definitions of gender, especially within public, urban, cosmopolitan spaces (women are not supposed to smell), but also by effectively challenging Magenta's comfortable and digitally-sanitized virtual depiction of the subway.

Times Square (2002), like *Token City,* was created from Magenta's personal urban experiences and uses the medium of 3-D computer animation and her skills as a sculptor, a painter, and a videographer. Moreover, both works provide an electronic, public window of critique into the fast-paced New York lifestyle on multiple levels - as it exists underground in the subway system or aboveground on Broadway - rendering New York not merely a "token city" but rather a microcosm of urban space around the world. As Magenta conveys, the four-minute long *Times Square* 3-D animation is "driven by the universal attraction to this urban icon" [8]. Using computer animation, "an ambient soundtrack made from sounds recorded at the real Times Square," as well as hip-hop beats and three of Magenta's custom-made video games which add to the interactive environment, Magenta recreates the exciting rush that accompanies Times Square, however, virtually: "hurried people stream down the sidewalks, taxis zoom by with horns honking, the air is filled with throbbing energy and random strains of music." Altering colors and textures of buildings to include her famous magenta, and substituting her own image and artwork in Times Square billboards, she imbues the space with her own subjectivity as a feminist artist and a creator of popular culture. As Magenta conveys, "I literally changed my art to fit Broadway and I changed Broadway to fit my art" [9]. Moreover, by using the Internet as a public forum to display works such as *Times Square* and *Token City*, she makes the local global, thus contributing to the transnationality of electronic art.

Magenta's public electronic works have continued to incorporate the urban sensibilities of *Token City* and *Times Square* as well as her image as a "hot pink" feminist icon. Not only have they grown increasingly reflexive and subjective, but they have also become increasingly political in terms of the statements they make about the emphasis on youth and sexuality in contemporary popular culture. Many of the images in *Club M: Avatars,* such as the laughing woman, the beating heart jumping rope, the blond with the flowing locks, and Magenta herself can be seen in the billboards of *Times Square*, thus creating

an electronic genealogy that links Magenta's work across time and space. Representing a wide-range of her animated characters or "alter egos," these avatars simulate "a discrete aspect of her own persona. The avatars reside at Club M, a cyberspace locale with an Internet address. They appear on video in actual spaces for specific museum and gallery installations. [However] in this work, the avatars are juxtaposed on an animated street mural, referencing Magenta's urban background" and her interest in public art [10].

Similarly, the video installation *Hot "Az" Hell* (2008) also uses urban elements, such as a brick wall, this time painted in magenta, to showcase a public street mural. Reflective of the metropolitan experience of living in a city like Phoenix - a cross between an urban environment and desert landscape that is "hot as hell" - the animated "vibrant, colorful, funky and contemporary" mural expresses "the overriding effect of the Arizona summer sun on urban and desert life." The progression of the video "mimics the hard light of the [Arizona] sun that changes the color, texture and intensity of everything it illuminates" [11]. It "combines a perpetually radiating sun and desert landscape digitally painted on a virtual brick wall. The blazing sun bleaches the wall until all color disappears, [with] the slowly moving video loop suggesting time lapse photography" [12]. Images on the wall include many of the same avatars or alter egos from *Club M: Avatars* as well as southwestern elements such as cowboys, cacti, the Phoenix skyline, snakes, skulls, desert rabbits and birds, and a blazing sun. Not only is Phoenix as "hot as hell" but, we presume, so is Magenta. By inserting her image in hot pink into the video, we infer that she is angry at society - perhaps at the stylized, cartoonish, way it depicts different groups - including women and African Americans, who she also inserts into the mural. The avatars in *Hot "Az" Hell* are meant to entertain; however, behind the vibrant and colorful public face of the mural lies a layer of social criticism.

Magenta has been an outspoken advocate of women's rights in the art world since the 1970s - before it was politically correct and even on the agenda of most women's organizations. She was one of the first academics to introduce women's art into the university curriculum, which she did in 1974 through Arizona State University, Tempe's program "Woman Image Now." Magenta maintained that women artists were not being taken seriously in the art or academic worlds. Thus, one her first activities was to lobby for the inclusion of the first female juror in ASU's Student Art Exhibition. This catalyzed her agenda and "Woman Image Now" eventually became a nationally-recognized program and participant in the American women's art network, promoting "the professionalism of women in the visual arts through education from a feminist perspective" [13].

Magenta continued her feminist activism through her participation in the Women's Caucus for Art (WCA) in the 1980s. She served as the president of the WCA between 1982 and 1984 and during her term "set two goals: to strengthen links between the national office and the chapters and to 'raise the feminist consciousness.'…Under Magenta, a national headquarters at Moore College in Philadelphia was established" [14].   Moreover, she also sought to increase the number of WCA chapters nationwide in order to strengthen its outreach and influence in the art world, which, in the 1980s, was overwhelmingly dominated by men. Magenta's other goals included making the WCA a multicultural organization and institutionalizing a communications network. To that end, she began publication of the quarterly *Huepoints*, which was one of the most effective networking strategies in the days before email and the Internet [15].

As an active member of the College Art Association's Committee on Women in the Arts, Magenta also attended numerous conferences worldwide - including three UN world conferences on women (Beijing, Nairobi, and Copenhagen) - all with the goal of promoting women in art [16]. One of her most productive conferences proved to be the UN's Fourth World Conference on Women in Beijing (1995), which

was also attended by then-First Lady Hillary Clinton. There, Magenta introduced the Internet forum *The World's Women On-Line!*, making her truly one of the pioneers in the electronic medium of the Internet. In fact in 1995, there was no global Internet network, so Magenta used projectors to display saved versions of her website. The website remains one of the first transnational "electronic art networking projects…[using] the Internet as a global exhibition format." It "focuses attention on the vast resources of women's experience and culture…[and] bridges language barriers though art imagery and promotes interdisciplinary collaboration between [female] technologists and artists." Moreover, "all media are represented, from painting and sculpture to crafts, ceramics, photography and computer art," providing women, especially those from developing nations, with a free and accessible means of displaying their art both instantly and globally [17].

In 2002 and 2004, Magenta participated in a community engagement project, "Shelter Against Violence: A Case for Empowerment," at the YWCA Haven House in downtown Phoenix, where she and a group of students trained the women at the shelter in multimedia computer skills. Each of the twenty-eight residents created their own website to post artwork as well as their autobiographies, family photos and resumes for potential employers to view. As Magenta conveyed, "Most of these women are homeless and accustomed to society telling them no. [This] opens doors for them and empowers them" [18]. The women's struggles – and the process of rebuilding their self-esteems through the healing mechanism of art – were documented through Magenta's film *28 Women: A Chance for Independence* (2005). The documentary was inspired by the residents who "described their individual pursuits toward self-reliance…[such as] completing a basic education to qualify for a job, juggling work and childcare, budgeting, and maintaining sobriety." Magenta was particularly "moved by the determination of these women to overcome adversity to make a new life for themselves and their children" [19].

Magenta is not only a world-renown electronic artist whose works have been screened globally, but she is also a feminist activist who will undoubtedly inspire future generations of women. However, as Magenta readily admitted in a 2008 interview, the work of activists has and always will be a struggle: "I didn't wake up one morning and say 'I will be a feminist.' My activity in the women's movement was - personally and professionally - for my own survival." According to Magenta, while strides have been made towards gender equality in the arts, "the same attitudes toward women are still there, but they're expressed more subtly." While discrimination has partially gone underground, the most dangerous obstacle that remains for women is, ironically, women themselves: "Some obstacles are created... by women…because of conditioning… unfortunately, many younger women have no education relating to feminism, so they join the rest of patriarchal society in rejecting it" [20]. Thus, Magenta envisions that the future of women's art will not only involve the creative process, but will also include educating younger women and continuing the public struggle to be heard.

References and Notes:

1. herbergerinstitute.asu.edu/directory/selectone.php?ID=164
2. www.public.asu.edu/~muriel/cc/
3. Ibid.
4. www.phoenixnewtimes.com/1990-04-04/culture/sparallax-universe/
5. M. Magenta and M. Udow, "Token City." Proceed. of the Int. Conf. on Info. Visualisation (Wash., DC: IEEE Computer Society, 1998), 224.
6. 66.9.5.150/reelny/previous_seasons/reelnewyork2/i-magenta.html
7. L. Shiner and Y. Kriskovets, "The Aesthetics of Smelly Art." J. of Aesthetics and Art Criticism 65, no.3 (2007): 273–274 ; www.aellsworth.com/works/solo_actual1.html
8. www.judymalloy.net/newmedia/muriel.html
9. www.phoenixnewtimes.com/content/printVersion/170688/
10. asuartmuseum.asu.edu/2007/artfaculty/artists/magenta.php
11. www.tempe.gov/tca/gallery/Exhibitions/Dry/magenta.pdf
12. asuartmuseum.asu.edu/2008/artfaculty/magenta.php
13. M. Magenta, "Woman Image Now." Women's Stud. Quart. 15, no.1/2 (1987): 56.
14. N. Broude, The Power of Feminist Art (NY: Harry N. Abrams, 1994), 99.
15. E.H. Fine, "One Point Perspective." Woman's Art J 13, no.1 (1992): 2.
16. Frontiers 17, no.3 (1996): 242.
17. wwol.is.asu.edu/intro.htm
18. www.womensenews.org/story/arts/030919/battered-women-paint-their-pasts-imagine-future
19. herbergerinstitute.asu.edu/annualreport/2005/shelter.html
20. A. Abrams, "When Girl Power Becomes Woman Power." Desert Living, May 2008, 73–74.

EMBEDDED SOUND: A PROJECT ON TURKISH TRADITIONAL CALLIGRAPHY AND ITS MULTI-TOUCH TRANSFORMATION

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This paper is about the idea of composing contemporary interactive screen designs using multi-touch technology in union with the dynamism and spirit lying beneath the art of Khatt. For the auditory orientation, a wind instrument called 'ney' has been chosen. Demonstrating the same space of time and variability with the exhalation, ney is an instrument originating from the philosophy of Tasawwuf as a visual concept and a musical one.
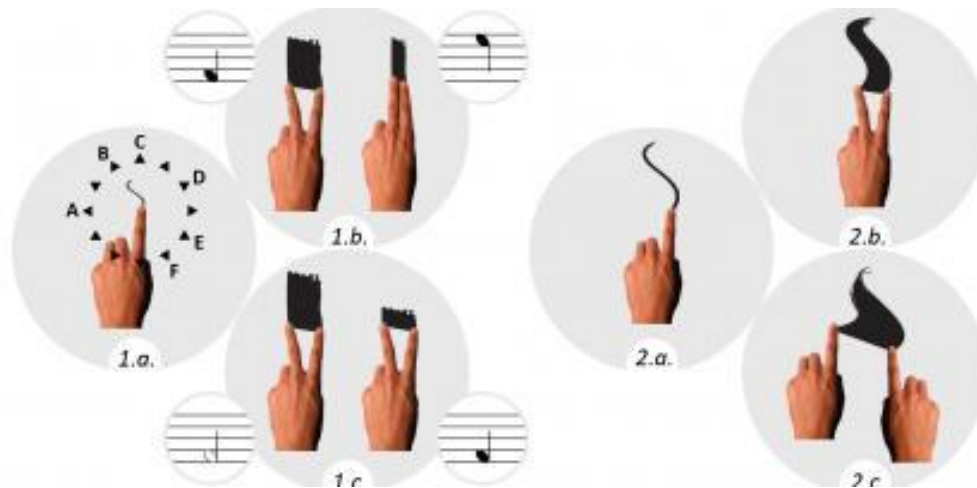
Fig 1. The relation between sound and image and the gestures for different line types.

Fig 2. A composition according to the gestures 'About Absence'.

Introduction

As digital technologies evolve, new forms of art are discovered by designers and artists. Yet throughout this fast evolution it is hard to say these art forms develop a solid background. We believe that one of the many reasons to this may be the fact that conventional input devices such as mouse or keyboard, do not provide freedom to hand and body use that were essential in traditional arts. It's a credible idea to achieve a well established approach by experimentally adapting art forms from past cultures to new digital media. Traditional arts in which body motion is used can be a source of inspiration for artistic achievement in digital media. [1] We believe one such subject of inspiration can be Turkish Traditional Calligraphy known as '*Khatt'*.

With the inspiration from the methodology and philosophy of this traditional art form, our aim is to create an interactive art tool that benefits from the possibilities of digital technologies. With interaction, we don't mean to create a series of preset moments for the participant to interact with, or a tool to get randomized outcomes, but a way to consciously create the art work itself.

Overview of Turkish Islamic Calligraphy

Khatt, which literally means '*line'*, is described as '*the art of measured and beautiful writing*' using the Arabic alphabet. [2] Khatt emerged after the evolutionary period of Arabic letters, between the 6th and 10th centuries. During the *Anatolian Seljuq* period, from the 11th to the 14th century, and the Ottoman Empire, from the 13th to the 20th century, calligraphy not only was regarded as an art form itself but also made a significant contribution to the other decorative arts and architecture. [3] Between the 17th and 19th centuries, Turkish artists brought figurative and philosophical depth to the tradition.

In the practice of calligraphy, a pen that is made of a special kind of reed, - the same kind which the musical instrument *ney*, "reed flute" is made of-, a calligraphy ink that is made of soot, and a special calligraphy paper is used. [4] The khatt artist (*Khattat* in Turkish) candidates, with the guidance of their masters, pass through not only a long and disciplined technical education period, but also a philosophical education towards perfecting their body and self-control. Along with the hands and wrists, they learn how to use their whole body, posture, and breath, in order to represent their world view on the paper. The one who accomplish to reach the master level, are qualified with a practicing certificate (icazetname) by their masters and obtain the authority to sign their own works. [5]

Due to the religious prohibitions of their historical period, many artists stayed away from figurative painting. This constraint caused them to apply 2D visualizations through religious writing. [7] It was mostly verses and sayings from the Qur'an that were visualized, with the purpose of symbolizing words and ideas. This approach increased the strength of the emotional content. [8] Turkish Islamic Calligraphy was a favored art form during the 19th and in the beginning of the 20th centuries. After the fall of the Ottoman Empire and the foundation of Turkish Republic, due to the 'modernization movements' such as the change of the alphabet from Arabic script to Latin script, and the liberation of other plastic arts, calligraphy ceased to be popular and turned into a traditional and rare art form which is taught in a limited number of specific institutions.

Multi-Touch Technology and Inspirational Breath- Rhythm Structures in Khatt and Similar Art Forms

According to the arrangement, calligraphic compositions can be classified under four titles, which are "text in a line", "text in stack", "pictorial text" and "*tugra*" that are used as sultan's signatures. [9] In this project we studied pictorial texts that demonstrate both iconographic and typographic features and in which plastic quality is in the foreground.

When the pictorial text-based *khatt* compositions are in question, even if the text is not legible, the dynamic structure of the pictoriality which emerges from the connected letters, gives a feeling of rhythm to the reader. [6] The eye follows the line in the composition, thus the reader gets the feeling of drawing the whole composition from scratch when the eye catches the rhythm.

This is actually an experience which is more common among the calligraphers during the creation process of calligraphy. While a calligrapher creates a composition, he not only uses his hands and wrists through the use of pen, paper and ink; but also his breath and rhythm and his whole body as if he is one sublime spirit. This spiritual and emotional experience is projected on the visual language of the composition. In other words, we can say that the main form, which is formed by words, is first shaped through the calligrapher's body, and then it is projected on to the paper.

This time and motion-based creation process has been experimented in various other art forms. For instance, a similar method is used in the art of *ney* playing, (or *ney blowing* as a preferred term by the musicians) which is performed within Sufi music. The visual structure of the *khatt* and the auditory structure of the *ney* of Sufi music have key features in common. [10] The connections between the letters in the calligraphy and the soft transitions between the notes in Sufi music are parallel. While a calligrapher is drawing a composition, he inhales and holds his breath and completes the composition in one cycle of breath. The use of breath during this drawing period have similar uses of rhythm and breath as *ney blowing*, which has a principle of using the breath fully.

Within interactive media works, visual and auditory elements are used to create a complementary whole. That is why we argue that an inspiration from the common features of calligraphy and Sufi music can provide a significant contribution to the development of a contemporary and interactive artwork with a new language of expression.

However, while generating this kind of an artwork, there are crucial points to be taken into account:

First of all, *khatt* does not merely consist of the literal meaning of the text. The sacred text is transferred along with the stress and intonation from the body to the paper. That is why; it is not possible to get the spirit of a calligraphic work only through the literal meaning of the words written. [11] The whole meaning of the composition is constructed by and through its performance.

Reproducing a calligraphic performance is never less demanding than the original one. The calligrapher must comprehend all the visual and literal elements of the composition, and realize the performance just like an expert orator. [12] The audience can get the full meaning of the *khatt* only if it is created in their presence.

Today's technologies have the potential to reveal the previously hidden philosophies behind calligraphy and make the audience comprehend the spirit of its birth. As a remarkable example, multi touch, as today's popular technology, can recognize the touch, the position and the motion of more than one finger. As it leaves the conventional mouse and keyboard interaction behind, the user gets a more intact

interaction with the screen. With the development of interfaces sensitive to multi-user and multi-touch inputs, the users are able to use both of their hands with more natural gestures. [13]

In our study, these fundamentals of multi-touch technology provide us with the advantages of increasing the impact of the work by directly using gestures instead of traditional user interface devices and their constraints, a wider and closer screen as an ergonomic and sophisticated workplace environment, and the possibility of more than one person to participate in the composition creation process.

Embedded Sound

The purpose of the project developed for this study was to create an application that allows the audience with no prior calligraphy background to experience the performance process of the calligraphy by reproducing it themselves. If the user requires guidance on the use of the body, pen and breath of a *Khatt* artist, the application should give helpful hints and clues.

In order to accomplish this, we first eliminated the use of pen and paper and replaced them with a multi-touch screen. We then designed an interface that resembles the *Khattpaper* on which the users can draw *Khatt* lines with their fingers, with the help of hints when the users need help on form, speed and rhythm. Because the breathing technique of *Khatt* requires a deep and disciplined training that cannot be completed in a real-time performance, we chose to use sound effects in harmony with the breath. This enabled the audience to overcome the tendency to make untimely breaks in their performance. We used samples of Sufi music, which has significant similarities with the performance of *Khatt*.

The project was designed on an Apple IPad multi-touch screen, with a digital background imitating natural paper texture. The user activates the system and starts drawing by touching one or two points on the screen. By dragging the fingers on the screen, the user constructs the line and hears the music. Both the sound and the line are interrupted as soon as the contact of the fingers with the screen is lost.

There are four different kinds of relations between the sound and the image in the calligraphy:

1. **The direction of the line:** The program creates different audial responses in accordance with the changes in the direction of the line being drawn by the user. Each musical note has been assigned to a different direction in a circular scheme. A change in the direction of drawing leads to a corresponding change in the sound (Fig. 1.1.a).
2. **The thickness of the line:** The distance between the two fingers that are touching the screen represents the thickness of the calligraphic pen. This thickness, which is the thickness of the line being drawn on the screen, also defines the intensity of the breath that is playing the Ney and thus the octave of the sound being played. As the line gets thicker, the octave becomes lower (Fig.1. 1.b).
3. **The length of the line:** The length of the line is linked to the time length of blowing. The note is played as long as the line continues. This allows the user to feel the heaviness of the time that passes while drawing and also convinces them to create uncut lines (Fig.1. 1.c).
4. **The speed of the drawing:** The volume of the sound coordinates with the drawing speed. The faster the performance is accomplished, the stronger the sound. When an optimum volume is met, the user is expected to adjust to the ideal speed of the performance.

GESTURES-LINE TYPES AND DRAWING STYLES

Four different gestures have been introduced into the application:

1. In the case of one-finger touch, a black ink track is left at the point of contact, and the track will follow the finger as long as the contact remains. Ney sound will be played at the highest predetermined octave, in the direction of the hand. When the contact is over, the sound stops but the track of the line remains (Fig. 1.2.a).
2. In the case of two-finger touch, the distance between the two contact points will act as the tip of the calligraphic pen. As the hand moves, a calligraphic line will be drawn as thick as this distance. The Ney will play a musical note according to the direction of the mid-point of the two fingers, and the octave will be determined by the thickness of the line (Fig. 1.2.b, 1.2.c).
3. In the case of three-finger touch, the closest pair of contact points will act as the calligraphic line; the third will remain as a separate thin line. Each line will generate its own sound.
4. In the case of four-finger touch, two pairs are selected from the points closest to each other. Two calligraphic lines and their corresponding sound effects will be generated.

Composition

The traditional calligrapher forms text in an abstract or concrete shape in order to enhance the meaning of the subject. Khatt artists usually avoid color and perspective and prefer using artistic principles such as white-black balance, perceivability and anatomical consistency for the sake of simplicity. [8] They use bonds between letters to assure continuity from beginning to end and to reach an unlimited number of letter combinations. In this way, a single line can result in an incalculable number of diverse holistic forms.

In order to mimic the Khatt recreation performance, we developed various different compositions to be completed in one breath and one-line cycles as an alternative to freestyle creation. We refrained from using original Pictorial Text style because of legibility problems as well as the difficulty of re-creating such complicated artwork. By developing various linear and visual compositions using the above gestures (Fig. 2), we expect that users will be able to attune themselves to the sense of time during the performance and follow the guiding hints effortlessly throughout the performance.

Conclusions

In this research, we explore a new way to generate an innovative, pioneer expression language in gestural user interface area with the inspiration from traditional calligraphic art. When the project process is analyzed with the aim of seeing the results of this research clearly, it's seen that there are 3 inspirational facts in Khatt. These are *the unity and fluentness elements of the form, the use of breath and rhythm in the performance, and recreation element of its philosophy*. At first, with the inspiration of recreation, we developed a drawing tool that is used by body motions. In this way, the participators who do not even know anything about Khatt can experience this implementation beyond vision. The most important component of experiencing *khatt* performance, using of breath and rhythm properly, directed us to use sound in order to represent this element. In order to get sound as secondary output during the performance, the gestural characteristic of hand movements are distinguished and mapped to the auditory traits.

Lastly, with the inspiration of the unity and fluentness elements of the form, we created various visual compositions and designed an interface along with some clues so as to be followed by the users.

In the light of the progress of this project, it can be seen that Khatt can be source of inspiration for gestural user interface design. We have evaluated the novelty and advantages that evolved from these structures, under a number of different topics.

From the view point of Khatt, recreation is made possible by using new technologies instead of traditional supplies. The philosophy behind this art has been made comprehendible to the untrained viewer in a contemporary means. Visual and rhythmic details of this art form are featured not only by recreation as in classical terms, but also by audial supports to address different senses. Therefore, the emphases of body movements are made more perceivable.

New expansion opportunities are presented for the Khattats. The guidance of sound in the drawing process may bring out new aspects and expressions. By using audial output as an instrument, different lineal forms can be practiced.

From the viewpoint of gestural interaction technologies, the most remarkable finding is the unconnected outputs (visual and auditory) can be acquired by only one gestural input synchronously. The most important discrepancy of this project from previous similar studies is the way that both outputs work in accordance to the direct manipulation principle and carry directive aspects by giving instant feedback. Therefore, both the sound directs the visual and the visual directs the sound within all attributes of the applied gestures, such as presence, orientation and speed. Neither of the outputs are each other's coincidental result. With a little experience with the tool, both of the outputs can be acquired consciously.

It is also once more observed that, innovative ideas in the interactive media design field can be derived with the inspiration from traditional arts and further research should be made on other traditional arts that haven't been dealt with so far.

References and Notes:

1. Oğuzhan Özcan, "Turkish-Ottoman Miniature Art within the context of electronic information design education," in Journal of Technology and Design Education 15, no. 3 (2005): 237-252.
2. Eczacıbaşı Encyclopedia of Art, Vol. 2 (Istanbul: YEM Pub, 2008), 668.
3. Oktay Aslanapa, Turkish Art (Istanbul: Remzi Bookhouse, 1984), 386.
4. M. Uğur Derman, Pen, Vol. 24 (Istanbul: DIA Pub, 2001), 245-246.
5. Oral Onur, Edirne Khatt Art: The Reign of Line (Istanbul: Dilek, 1985), 167.
6. Ibid., 9.
7. Bülent Özer, Commentaries: Culture Art Architecture (Istanbul: YEM, 1993), 50.
8. Sezer Tansuğ, History of Painting Art (Istanbul: Remzi, 1992), 156.
9. Hüseyin Gündüz, "Technical and Aesthetic Measures of Khatt" (PhD diss., Mimar Sinan Fine Arts University, 1994), 94.
10. I.Hakkı Bursevi, Spirit of the Mesnevi (Istanbul: Insan, 2006), 90.
11. Anthony Welch, Calligraphy in the Arts of the Muslim World (Austin: University of Texas Press, 1979), 33.
12. Brinkley Messick, The Calligraphic State: Textual Domination in a Muslim Society (Los Angeles: University of Callifornia Press, 1993), 240.
13. J.Y. Han, "Low-Cost Multi-Touch Sensing through Frustrated Total Internal Reflection," Proceedings of the 18th Annual ACM Symposium on User Interface Software and Technology, New York, (2005).

URBAN CRACKS: INTERSTITIAL SPACES IN THE CITY

Elly Van Eeghem, Riet Steel, Griet Verschelden & Carlos Dekeyrel

This paper focuses on the research trajectory of visual artist Elly Van Eeghem. Through her practice of video and intervention in public space, she will reflect on the role of artists in re-shaping urban cracks and the influence of these spaces in re-thinking artistic practice.

Fig 1. Oceaniëstraat / recto, 2011, Elly Van Eeghem, video. © Elly Van Eeghem.
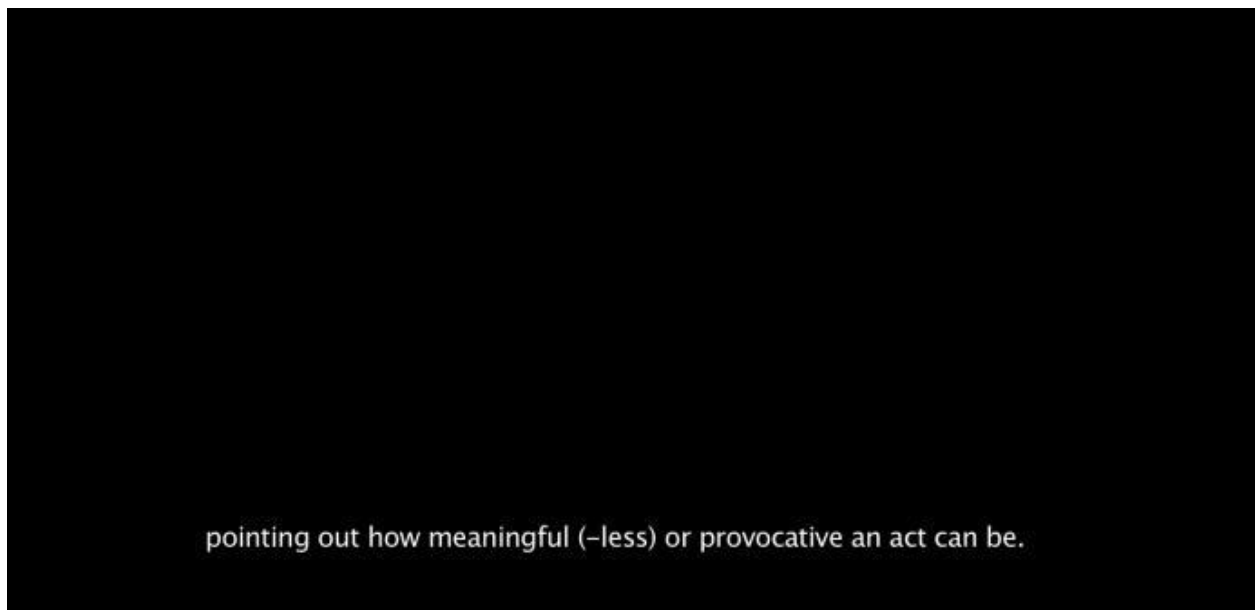
Fig 2. Oceaniëstraat / verso, 2011, Elly Van Eeghem, text projection. © Elly Van Eeghem.

Fig 3. Urban Fabric #19, 2010, Elly Van Eeghem, lomographic print, 90 x 90 cm. © Elly Van Eeghem.

Urban Crack as a Concept and a Case

The growing number of neglected, residual spaces challenges the functioning of our cities. These interstitial spaces fall between the familiar boundaries of urban planning (generally, they cannot be found on official city maps) and are often labeled as wastelands, characterized by an apparent void. The fact that urban cracks are not planned, does not mean that they are empty. They host informal practices such as fishing, squatting, waste dumping, taking the dog out, graffiti, drug use or underground festivals. However, these uses are often oppressed in more delimited urban spaces that are dominated by economic and consumptive logics.

Urban cracks are conceptualized as in-between time spaces in which different logics meet and conflict. Philosopher Dirk van Weelden described these places as manifestations of the inoperative city; an accumulation of disparate spatial experiences without a binding order, where form and void coincide. [1] The concept of urban crack is similar to 'site' recalling the meaning given to it by Anne Cauquelin: "Le site se trouve à l'intersection du lieu et de l'espace, ce n'est ni l'un ni l'autre, mais une sorte d'hybride." [2] ("A site finds itself at the intersection of place and space, it is neither the one nor the other, but a kind of hybrid.") Urban cracks are hybrid spaces since they belong to the measured and organized public space as well as to the intimate domain. These functionally indeterminate sites seem to have grown rather than planned and therefore appear to be the reverse of urbanism, "because they obviously do belong to the city." [3] Moreover, urban cracks belong to a constantly changing city, where houses are built and pulled down, where vacant lots emerge and disappear. These spaces regularly await a future destination within the context of urban renewal.

Last year, Elly Van Eeghem started working in one of the most profoundly transforming neighborhoods in the city of Ghent. The northern dockland area of Muide-Meulestede-Afrikalaan is subject to a large-scale urban renewal project that converts it into a new district by the water. A peculiar spot on Oceaniëstraat struck her: a leftover space surrounded by an industrial site, a private residence and a passageway for trucks and inhabitants of a nearby housing block. It is mainly used for illegal dumping and thus considered by many residents as a thorn in the flesh.

Van Eeghem decided to observe this place for several weeks, each visit setting up her camera. From these repeated returns originated an audiovisual chronicle of her performance in the space in addition

to the performance of the space. This ultimately resulted in an installation of both video and text: Oceaniëstraat recto/verso. [4]

The inlet jumped out of all other places.

One of the smallest gaps I encountered in the area

intimate

manageable.

A small triangle, cut out between large sites of productivity, inviting to be used

to leave something behind (that you no longer need)

to ask a question

to launch a proposal.

The inlet suggested something

something I'm still peeling off.

Week after week, Van Eeghem built structures using waste materials encountered on the spot, gradually writing a sentence on the wall: "Feel free to act and to proceed in whatever you do." Her interventions questioned the way in which to intervene as an artist in a constructive and critical manner, how layered and charged words can become when landing in a place like this. We experienced video to be a medium with the potential to trigger encounters with passers-by, to open discussion and to unveil conflicting logics of the city.

Artists Reshaping Urban Cracks

"Speed calls for emptiness and emptiness screams for haste." [5]

More and more urban policy makers appear to be concerned about empty space, afraid of losing control of what might arise from it. In an attempt to organize and boost vacant land, they often set up alliances with inventive forces of artists and creative non-profit organizations, offering them a temporary 'breeding ground.' Temporary, because the construction blueprints are already drawn, awaiting implementation. This way, certain creative groups no longer need to illegally claim their field of activity and are supposed to give rise to new dynamics and interests in the area.

In the mission statement on public art in the city of Ghent it is put forward that temporary interventions should generate dynamics. Yet, what kind of dynamics are aimed at? And are those the same dynamics artists intend to generate? Because the breeding ground scenario holds potential instrumentalization risks for artists: by engaging themselves in a dominant logic of city branding, their intentions might turn against them. [6] By making the area attractive to investors, project developers and high-income groups of residents, their work risks to be put on as a beautifying and boosting project. As Rosalyn Deutsche

alerted, this kind of promotion of art appears to politically neutralize its use within the city and to mask its political outcomes. [7]

Who selects the icons?

What is to become a landmark and what is to be ignored?

Do the housing blocks at Scandinaviëstraat just need a brighter color?

How does a landmark differ from public art?

Should public art truly render the city more beautiful? (than it really is)

Or more transparent? (than it appears)

Considering these questions, we do believe artists can play a critical role in (re-)imaging of the city. Public art can reveal ambivalent logics and practices. Will a crowd barrier transformed into a bench invite people to sit on? Does a car that is parked upside down still respect the public road code? What happens when we add color to public fountains?

Artists can bring into visibility the city's logics and are able to reinterpret, short-circuit or recompose them. Through their work, they can narrate changing urban conditions.

Throughout the city, vacant voids are being filled with structures.

Is this a different design? (I mean: no design at all.)

Starting from what is already there, creating new structures, entangled with the place

its history, its current use. (a prediction for tomorrow)

Maybe that is the attractive thing about working with waste materials

because nobody has expectations.

If I get the old computer screens neatly in a row, the inlet could look at us

maybe not in a blaming or a reflecting way. Just as a point of view

but differently.

A language textbook, a puzzle, a hobbyhorse. Puppets against the wall.

Pale green seat cushions as the front row of this dumping ground scenography.

An invitation to look at what is present. And how it changes.

As Moritz Küng stated, "the city no longer occupies a clearly delimited space, but has become a bewildering and dynamic terrain vague consisting of shifting neighborhoodly coexistences. In consequence, its identity has constantly to be re-explored and re-defined." [8] Artists can adopt this role as counterweights to a dominant imaging of the city. Through the embedding of artwork in urban cracks, these spaces might turn out to be indicators of existing frictions within urban culture. As the breakdown situated in the interstitial mechanical spaces of a building often reports an entire unstable construction, urban cracks can tell us something about a precarious urban planning predominantly driven by economic concerns.

Urban Cracks Challenge to Rethink Public Art

It is precisely the interstitial, complex character of urban cracks that can influence a dominant view of the city as well as the dominant conception of public art as a monumental landmark in public space. Does the constantly changing city not petition another way of situating art in public space?

Repeated returns to the same place create space for unforeseen encounters.

How do others interpret this sentence?

How do they look at the inlet?

How free do they feel in the area to do what they want?

Returning to the inlet to take a last picture, a man is looking for a new pair of shoes.

Reluctantly, I make him part of my last image.

You can only get away from something you return to. What you return to, is the place. The place is the crack that links leaving and returning. The place is the space of this turnabout. Architecture knows this so well: therefore it makes corners. Because in a circle, no turning is possible. (D. Lauwaert)

The undefined and layered identity of urban cracks, which attracts artists because of its openness to interpretation and counterproposal, necessitate time to grasp the space. These spaces demand what Elly Van Eeghem calls the 'tactics of slow return': to regularly call on the same space, allowing different perspectives to meet.
This relates to an alternative conception of public art as a dynamic paradigm of thought. In this regard, public art is not necessarily of a permanent nature but might as well include temporary interventions and symbolic gestures. "A movable structure is not necessarily temporary. What is seemingly transitory and ephemeral, processual and only a body of images, is often, by its illusion of stability, more durable than our eroding stone monuments." [9]

We imagine localized artistic practice not merely as the site-specific features of the artwork or the amount of community involvement, but primarily as the engagement of the artist to profoundly embed his/her work into an existing context. In a way, this is at odds with both the implanted monuments in public space and participative projects "engaging every-one but offending no-one." [10]

Through this interpretation of public art, the city functions as a starting point and the artwork as a trigger. Focusing on things already present instead of on a newly added value. As Anne Cauquelin said: "La ville ne devrait pas server de galerie à un monument supplémentaire conçu en dehors d'elle. Si la ville est oeuvre d'art, c'est dans ses pierres, dans sa manière d'être." [11] ("The city should not be used as an art gallery for an additional monument designed out of the city. If the city is a work of art, it is in its stones, in its way of being.") In consequence, the artwork is not merely an object, but a transformed perception of the environment. Through such interventions, artists map urban spaces in their own way. Their 'design on the spot' (as Patrick Geddes would have called it) becomes a performance of the space, rather than a representation or description of it.

Thus, they balance between the political and the poetic, about which Francis Alÿs wondered: "Can an artistic intervention truly bring about an unforeseen way of thinking, or is it more a matter of creating a sensation of meaninglessness that shows the absurdity of the situation? Can an artistic intervention translate social tensions into narratives that in turn intervene in the imaginary landscape of a place? Can an absurd act provoke a transgression that makes you abandon the standard assumptions about the sources of conflict?" [12]

The Artwork as Palimpsest of the Present City

We believe artistic practice embedded in urban cracks can independently generate a layered analysis and dynamic narration of our changing urban condition.

In the neighborhood of Muide-Meulestede-Afrikalaan, we tried to capture in what way urban cracks write back to the present city through diverse layers and remnants. How these spaces develop as metaphoric 'palimpsests': old manuscripts where different layers of writing shine through. Van Eeghem used multi-exposure lomographs to construct mosaic cityscapes that exhibit the accumulated iterations of a site; searching for traces of vanished human activity, fragmenting the chaotic city and reconstructing it according to her own logic.

Besides these fixed images, video proved to be an ideal medium to build a palimpsestic reading of urban cracks. Van Eeghem was able to reinterpret the site at Oceaniëstraat by working with diverse video layers during editing and manipulating the dimension of time.

Apart from that, the performative element of filming her own interventions functioned as a trigger for people to talk about what was happening in the neighborhood. Yet, sometimes the camera proved to be a barrier for people to start a conversation or made them walk away faster than they normally would have.

Back in Oceaniëstraat, there is a police car standing in front of the inlet.

The officer has found addresses in the dumped waste. He advises me not to work here, because the smell is obnoxious.

Whether he has noticed that there are old tracks buried in the earth?

He hands me his card.

Sint-Amandsberg district police officer. We are responsible for this area.

I wonder what he means by we. I wonder why police districts have different borders

and what this means (for him)

being responsible for an area.

The finalized installation was presented in a variety of contexts, from art galleries over community centers to academic symposia and student seminars. During each presentation, the reactions on the work were filmed: how the installation provoked communication, how it left some people indifferent or made others laugh or frown. This way, the performative character of the work continued and different perspectives and backgrounds started to cross. We experienced that the totality of the work managed to bridge certain gaps. Between the local and the global, the artistic and the academic, the experience and its representation.

References and Notes:

1. *Dirk van Weelden, "Stads leren!" in De Stad & De Pedagogie, auth. Stefan Hertmans, 67-97 (Ghent: Droom en Daad, 1998).*
2. *IUP Website, "Interview d'Anne Cauquelin par Thierry Paquot," October, 1999, http://urbanisme.u-pec.fr/documentation/paroles/anne-cauquelin-64781.kjsp (accessed December 2, 2010).*
3. *Zsuzsanna Gahse, "A Small Essay at Cities," in Another & Another & Another Act of Seeing (Urban Space), eds. Moritz Küng and Katrien Vandermarliere,204 (Antwerp: deSingel, 1997).*
4. *Text fragments in this paper are excerpts from this installation.*
5. *Paul Virilio, L'Horizon Négatif: Essai de Dromoscopie (Paris: Galilée, 1984).*
6. *Griet Verschelden, et al., "Positioning Community Art Practices in Urban Cracks," in International Journal of Lifelong Education 31, no. 3 (2012): 277-291.*
7. *Rosalyn Deutsche, Evictions: Art and Spatial Politics (Cambridge MA: MIT Press, 1996).*
8. *Moritz Küng and Katrien Vandermarliere, eds., Another & Another & Another Act of Seeing (Urban Space)(Antwerp: deSingel, 1997).*
9. *Labelle Prussin, African Nomadic Architecture: Space, Place & Gender (Washington-London: Smithonian Institute Press, 1995),157.*
10. *Patricia Phillips, "Out of Order: The Public Art Machine," in Artforum 27, no. 4 (1988): 95.*
11. *Institut d'Urbanisme de Paris Web Site, http://urbanisme.u-pec.fr/ (accessed May 30, 2012).*
12. *Francis Alÿs, A Story of Deception (London: Tate Publishing, 2010), 39.*

FROM LITERAL TO METAPHORICAL UTOPIAS: SPACE AND TIME IN THE WHITE CUBE

Christina Vatsella

In its literal sense, the term 'utopia' refers to the absence of *topos*. This condition is inherent in the new media artwork, which due to its immaterial status is not physically tied to a specific space unless displayed. In its metaphorical sense, 'utopia' has a significant ideological background. This paper attempts to indicate how the literal lack of *topos* of the new media artwork is related to its utopian nature.

When a term has different meanings, both literal and metaphorical, there is usually a common ground where all connotations intersect. Interestingly enough, the affinities between different meanings can go beyond the obvious, revealing historical interconnections and dialectical patterns.

Indeed, the term utopia [*outopia*] in its literal sense, refers to the absence [*ou*] of place [*topos*]. In its metaphorical sense, in which it is used today, 'utopia' is a term that originates from Thomas More's inaugural text and it seeks to describe the author's imaginary island country. According to Fredric Jameson analysis, two distinct lines of descendency may be identified from More's text. This major distinction is also adopted here. The first notion of utopia refers to the systemic, revolutionary political practice, aiming at founding a whole new society. The other line of descent, more obscure, refers to the omnipresent utopian impulse related to "the deceptive yet tempting swindles of here and now, where Utopia serves as the mere lure and bait for ideology." [1]

When it comes to the new media, their literal lack of *topos* is intrinsically related to their profoundly utopian nature. In other words, the metaphorical is essentially linked to the literal in many levels. This paper attempts to trace some of the interconnecting threads between those two dimensions of utopia.

Literal U-topias

One of the most fundamental characteristics of the new media image - a term that embraces digital or analogical moving image in all its imaginable forms - is its lack of *topos.* The moving image is a latent immaterial entity stocked in a device (digital or analogical) and thus deprived of actually occupying physical space. This absence of space, or more specifically, the lack of actual, material volume derives from the lack of objects. Of course, going beyond the object is not an exclusively new media characteristic. Conceptual art has been practically based on that principle. And, even before that, the *objet d'art* per se had already been through an important demystification since the ready made.

Abolishing the material entity of the work of art has clear political connotations. Lucy Lippard introduced the term 'dematerialisation' of the art [2] in order to describe the urge of going beyond the official art by spreading it in all social layers. Art would thus become a common activity and consequently notions of property and reproduction of the work would be eliminated. Dematerialized art would therefore actively participate in the transformation of the society. Art would then disappear in the sense that it would be generalised throughout society as the very aesthetisation of daily life. The fusion of art with

life, in a Marxist approach would be the negation of the division of mental and manual labour, which is a prior condition of the separation of mankind in classes.

Even if the fusion of life and art is a highly utopian, and thus an unattainable desire, the detachment from the object of art is a fact. And the non-object art a priori cannot be distributed, sold and collected. To speak in Marxist terms, non-object art materializes the negation of commodity fetishism.

But still, even if the new media image per se does not have a material entity, in new media art objects do exist even if their status is peculiar. The material part of the work consists of the tools used to present the image (monitor or videoprojector) as well as the physical container of the image such as the videotape (replaced nowadays with DVD, USB etc). If the projecting or broadcasting apparatus is an auxiliary part, in the sense that it's not connected to the work, the videotape is intrinsically linked to the image itself: it is the medium containing the message that is conserved in a latent form.

The question that is naturally raised is whether this storage apparatus is capable of counterbalancing the object's absence, thus rendering the work susceptible of being integrated into the distribution circuit.

New media artwork a priori resists commercialisation due to its fundamental characteristic: the reproducibility. Every tangible format of conserved moving image is in fact a copy that can be further reproduced without any limit. In every day life, for every work there are several exhibition copies, screening copies, not to mention conservation copies to different media following the evolution of the technology. All these *simulacra* prove to which extent we can happily (and legally) reproduce any work without any consequences to its nature or status. Hence, there is not such thing as authentic or unique videotape, or DVD or even worse, as authentic computer file.

In order for video art to enter the market, that characteristic had to be abolished. As a matter of fact, an absurd system of artificial control of the potentially unlimited reproducibility of the medium has been invented: the mode of limited editions, accompanied by certificates that assure the 'authenticity' of each copy. The limitation of the number of copies creates the illusion of exclusivity and thus increases its market value.

Historically speaking, at the dawn of the creation of new media art, artists acknowledged the challenge that the non-object status and the reproducibility of the medium represented for the institutions. The institutional critique became a major pillar of their ideological framework since their desire was not to enter the system but to transform it profoundly; [3] institutional critique should thus be perceived as a major aspect of the utopian urge to change the society and to merge art with life.

Installing the Image or the Passage to a *Topos*

If controlling new media art reproducibility, or in other words, establishing the commodity fetishism was one way of taming its utopian nature, settling down the image via the installation was the second.

The new media image a priori lacks *topos*. When displayed within the context of a new media installation, the moving image, "hung" on the wall or onto the monitor - to speak in traditional exhibition terms - acquires a physical location and becomes a more or lessphysical presence within the exhibition space.

However, even when the image comes into being in a specific place, it remains immaterial and thus deprived of volume. Consequently, no space is physically occupied by the moving image per se (monitors or projectors cannot be considered as part of the artwork as such, since they are auxiliary devices) and the space of the installation is practically empty. Yet, when the image unfolds in that specific place it activates a specific space. That space is a zone within the white cube - turned black for the occasion - where the moving image meets the viewer and creates "a passage for bodies and figures in space and time." [4] In other words, in spite of its immaterial nature, the image creates a space, namely the installation territory.

But when it comes to the moving image, which space and which time exactly are we referring to? Within the physical place of the installation, a second one is embedded, the filmic here and now of the moving image. The actual place where the image was taken is being transferred via the projection into the actual installation space, creating an additional spatiotemporal layer. These two parallel levels co-existing simultaneously generate several dialectical patterns. A typical example of conjunction of these two layers is the reconstitution of the filmic spatiotemporal condition within the installation space. In *Mapping the Studio II with Color Shift, Flip, Flop & Flip/Flop (Fat Chance John Cage)*, (2001) Bruce Nauman adjusts seven cameras in his studio in a way that they cover the largest part of its surface and lets them film for approximately 6 hours. When installed, the image that derives from this camera circuit is being projected without editing on seven 3x2 meter screens covering the entire gallery. His studio is thus being virtually transported and reconstructed via the moving image in the installation space. Freely interpreting Borges' mapping, Nauman grafts his studio space onto the gallery space, creating a virtual map of the same scale as the empire itself.

Borrowing the terms of the Foucauldian theory of heterotopia*,* the new media installation is "capable of juxtaposing in a single real place several sites that are in themselves incompatible." [5] By going further in the analysis of the new media installation's spatiotemporal condition, one realises that it can be considered as a paradigmatic contemporary heterotopia. Because it is, in fact*,* "a system of opening and closing that both isolates (the sites) and makes them penetrable". The new media installation is a temporary construction within the exhibition space made basically with temporal walls and curtains. It is often closed, partially or entirely, in order to avoid the spilling out of image and sound. By outlining its limits, in more or less radical ways, the work preserves its own integrity. At the same time, the blackout curtains or the narrow passages between walls constitute the points of entrance for the viewers.

According to Gaston Bachelard, (space) "in its countless alveoli contains compressed time". [6] Which is true for all kinds of spaces but in the case of heterotopias, they "are most often linked to slices in time"*.* When it comes to the new media installation, the temporality of the artwork corresponds to the duration of the video image. That slice in time is repeated in a loop, thus establishing a temporality specific to the artwork. Hence, an exhibition turns into an assemblage of several spatiotemporal islets evolving simultaneously.

Like all heterotopias, new media installations "are not oriented towards the eternal".The work is ephemeral since when the projector is switched off, the image disappears without leaving any tangible traces behind, evoking an old anarchist slogan saying "your civilization ends when the electricity is cut off".

This unique and complex spatiotemporal condition is the outcome of transforming a 'u-topian' entity into a concrete here and now. At the same time, by installing the image, a utopian, wild form of art has

been gradually transformed into a tame, official and lately mainstream form of museum art, and consequently it has entered the market. As Martha Rosler points out, "museumization has heightened the importance of installations that make video into sculpture, painting or still life because installations can live only in museums".

The term 'museumization' within the framework of the institutional critique surely has pejorative connotations. However, the creation of a new species, even if it is mostly museum oriented, has enriched the art ecosystem. Beyond all political or social connotations, the new media installation as a form has opened a new field of experimentation and research, to which we owe some of the most splendid artworks of the last decades.

New Media as the New Utopia

Along with the utopias that arise from a political context, new media art has also reflected a broader utopian impulse. Through new media, the archetypical desire to tame nature and gain control has found a whole new field that would enable people to overcome the barriers of time and space, reviving even the ancient dream of teleportation. Inspired by the visionary theories of McLuhan, a vast literature, ranging from new media theory to science fiction, has outlined the belief in the miraculous potential of new media. They were about to inaugurate a new fascinating but also frightening world, situated somewhere between dream and reality.

A very characteristic media artwork that reflects that point of view is *Good Morning Mr Orwell* (1984) a new media performance orchestrated by Nam June Paik. On January 1st 1984, Merce Cunningham's minimalistic dance and Joseph Beuys' actions among other performances were transmitted to millions of spectators in different continents via a live broadcast shared between the Centre Pompidou and WNET TV in New York. The programme was also broadcasted in Germany and in Korea thereby developing an international network. Whereas the title of the work evokes the negative aspect of mass media, namely the Orwellian nightmare of mass surveillance, Paik seeks to prove that the television could eventually serve a positive purpose such as interconnecting people by rendering art available at the same time around the entire world.

It is the same spirit that emerges with his legendary video *Global Groove* (1973), the manifesto of the new video culture willing to become the melting pot of all different cultures and beliefs. Video was perceived by Paik as the new desperado language. In his most famous installations *Moon is the Oldest TV* (1965), where he recreates the moon phases onto monitors or *TV Cross* (1966), where nine monitors form a cross, Paik translates major icons and symbols of the humanity into the electronic image thereby creating a new universal visual vocabulary.

Driven by genuine fascination for the new media technology, Nam June Paik, the neo-romantic artist who wore Wellington boots in his studio for fear of being electrocuted, visualised a whole new world; new media technology would create a new visual culture resulting from the fusion of electronic music, performing arts and video image. In a state of totally utopian delirium, Paik went far enough to foresee medical implementations of the new media image. He believed that in the near future new media image would cure the blindness or that it would be used as an electro-visual tranquilizer (sic). [7]

A few decades later, the fascination towards the capacity of breaking the barriers of space and time switched medium, from television to internet. Internet is the new Utopiapar excellence. The question of

time and space, the reality of here and now definitely attains its more complicated and intriguing form. The ability of crossing the borders of time and space reinforced the development of a political framework. The delirious contemporary rhetoric based on the perception of internet as an immense collectivity is evocative of that political context; "digital revolution" or "virtual community" has become everyday language whereas the famous McLuhian term "global village" has been literally concretized in the internet era.

Just like the socio-political background of the television and the explosion of the mass media in 1960 and 1970 has been reflected in the video art, the political aspect of the (virtual) new land of promise has been crystallised in the internet art. The guerrilla television and the video works related to political activism that have marked the highly utopian era of videoart have been reproduced online three decades later. Tactical media, various forms of activism and openly political works denouncing the commercial use of internet have been at the core of the internet art creation (at least at the beginning); RTMark, etoys, Jodi to name just a few legendary moments. Their artistic status is quite ambiguous since, as Julian Stallabrass points out, "on the internet the border between political activism and cultural creation has been particularly porous." [8]

What we have described so far as the literally 'u-topian' status of the new media image makes its museum exhibition extremely challenging. If exhibiting a videotape is difficult, exhibiting an internet site is much more complicated. The institutionalisation of net art is indeed a very long and fascinating story that goes beyond the framework of this paper and will not be analysed in detail. However, the most interesting element here is the fact that the denial of internet 'u-topian' nature serves as a way to tame its utopian, revolutionary character. Two major examples support this primary thesis. First of all, internet sites are very often exhibited off-line. Cutting off the site from the web corresponds to the denial of the artwork's vital space. At the same time, the site is practically amputated since all the external links are automatically deactivated. The isolation of the site from the web prevents bad surprises regarding the exhibited content that could easily vary from pornography to personal email accounts provoking disturbing situations to the institutions.

The second one is, once again, the transformation of an internet site into an installation. Even if "video art's fate in the museum offers a dire warning to internet art" [9] whenthe latter is presented in a museum gallery it is usually bound to the actual here and now of the exhibition space. Media art history is indeed very coherent and repetitive since just like video artists have passed from videotape to video installation, internet artists have also developed net art installations seeking a more exhibition friendly form. That was a normal step of net art's evolution according to Peter Weibel since "it is the system of art that obliges artists to express their ideas in a specific space." [10] Hence, the "museumification" of this new media art passed, once again, through the installation of the new media image in a specific space narrowing both 'u-topian' and utopian characteristics.

New media art evolves in a profoundly paradoxical, if not schizophrenic, condition: new media constitute the key for the expansion of late capitalism and yet they can endorse, create and diffuse the most fundamentally revolutionary content. Ranging from globalised commerce to local revolutions, from state propaganda to alternative journalism and direct democracy, and from pornography to art and science, the contemporary form of new media, internet, can engulf the most contrary aspects. That profound endemic antinomy is embedded in "globalization itself, which can indeed pass effortlessly from a dystopian vision of world control to the celebration of world multiculturalism with the mere changing of a valence". [11] Red Art can, indeed, flourish within the late capitalism reality. Maybe because capitalism is strong enough to appropriate it for its own good. Nevertheless, Utopia, standing at the crossroads

between reality and imagination, faith and deception, authenticity and appropriation, exists as an ever-lasting source of inspiration for art and for life, even if their fusion has not yet been accomplished.

References and Notes:

1. *Fredric Jameson, Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions (London-New York: Verso, 2005), 3.*
2. *The term was introduced in Lucy Lippard and John Chandler's article, "The Dematerialization of Art," in Art International 12, no. 2 (1968).*
3. *Martha Rosler, "Video: Shedding the Utopian Moment," in Illuminating Video, eds. Doug Hall and Sally Jo Fifer, 31 (New York: Aperture, 1990).*
4. *Margaret Morse, "Video Installation Art: The body, the Image and the Space-in-Between," in Illuminating Video, eds. Doug Hall and Sally Jo Fifer, 154 (New York: Aperture, 1990).*
5. *Michel Foucault, "Des Autres Espaces," in Dits et écrits par Michel Foucault 1954-1988, Volume IV (Paris: Gallimard, 2001). English Translation by Jay Miscowiec in the Michel Foucault texts' database http://foucault.info (accessed May 12, 2011). All quotes come from that translation.*
6. *Gaston Bachelard, The Poetics of Space (Boston: Beacon, 1969), 8*
7. *Nam June Paik, Video n Videology (Syracuse, New York: Everson Museum of Art, 1974).*
8. *Julian Stallabrass, Internet Art: the Online Clash of Culture and Commerce(London: Tate Publishing, 2003), 90.*
9. *Ibid., 120.*
10. *Interview with the author in Paris on February 2005.*
11. *Frederic Jameson, Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions (London-New York: Verso, 2005), 215.*

TWO STEPS BACK AND ONE STEP FORWARD: REMEDIATION AS INNOVATION FACTOR IN THE CASE OF MACHINIMA

Thomas Veigl

The digital art of Machinima realizes narrations and installations in completely virtual sets. The increasing convergence of the computer game and film industries signals a process of change that has far-reaching consequences for production methods and copyright in both areas. The article shows how Machinima guides to social and cultural change and offers a theoretical approach to media evolution.

Machinima today is a worldwide phenomenon that in recent years has penetrated further and further into the media mainstream where it is fast becoming known as the most popular form of digital game art. Machinima technology is used to create computer-animated films within a virtual real-time 3D environment—in short, to produce films in computer games. The game's modified virtual environment, the objects, and avatars are used to develop scenarios that are then recorded and edited.

Machinima is strongly associated with linear narration and aesthetics of film and TV. Therefore it can be criticized as new art form or medium since the technology of computer game engines offers interactive potential as never before.

As well in the latest and most comprehensive publication on the subject, the "Machinima Reader," [1] Katie Salen and Michael Nitsche came up to this point. Salen remarked that, against initial expectations, the possibility of viewer participation is not realized in current machinimas. [2] And Michael Nitsche regreted that the performative character of real-time animation is not applied in most machinimas. [3] However under the perspective of media evolution new media precisely achieve their cultural significance by refashioning earlier media. This process which Jay David Bolter and Richard Grusin in their identically named and widely discussed publication called remediation [4] appears essential for achieving cultural and social acceptance which is further required for an economical and legal frame that matches the new art technique.

What follows is a summary of an investigation of the development and actual status of machinima which sets it in a theoretical frame of media evolution. The approach used follows the main features of Joseph Schumpeter's model of economic development [5]and Everett Roger's theory of innovation diffusion. [6] Traces of the invention of machinima, beginning in the mid-1990s will be located and its innovation, which appears at the moment to be completed will be described.

The invention phase comprises the period until the first complete problem-solving version appeared, a prototype whose ultimate use is not yet clear. It is not possible to pinpoint the beginning of this phase precisely, unlike its end, because every invention has a series of predecessors. To explore the invention of machinima I shall examine the immediate technological and cultural preconditions.

As the invention alone is not decisive for the form of its application or for whether a new media technology will continue to exist, the next section examines the prototype's innovation, which is articulated by

three indicators. These are: finding an accepted name for the new medium; the emergence of a commercial market for it; and the development of specific legislation.

Invention

Beginning with its invention machinima is closely connected with the very popular first-person shooter (FPS) games of the early 1990s in which the developers of id Software, John Carmack and John Romero, were significantly involved. Essential elements, which later proved to be prerequisites for machinima production, are the players personal point of view, 3D-graphics, real-time game engines, modifiability of game content, multiplayer mode, and in-game recording. These elements were present in isolated instances in 1980s computer games, but id Software consciously combined them in their FPSs to achieve an enhanced the payers immersive experience.

In 1996 the Quake movie "Diary of a Camper" was released by the Ranger Clan. In principle it was a recording of a Quake deathmatch with a short amusing narration referring to the game with text-based dialogues. Nowadays "Diary of a Camper" is widely recognized as the first machinima production - the first narrative produced with a real-time 3D game engine.

In the same year "Torn Apart 2: Ranger Down!", the first Quake movie with narrators instead of text dialogues, was produced. 1997 "Operation Bayshield" from Clan Undead was released, with added skins and lip movements, and the next highlight "Eschaton—Darkening Twilight" from the Strange Company, the first narration that did not refer to the game but had completely independent content. So around 1996 – 1997 we can indicate the prototype!

Innovation

In the phase of innovation, the invention encounters its proper application. I call this the society's differentiation of and function assignment to the new technology. As mentioned above, the phase's completion is marked by three indicators: (1) the accepted denomination of the new medium, (2) a nascent economic market, and (3) the formulation of specific legislation. Commercially viable forms reflect the social demand for a new product and determine its continued existence and further development. Media history shows that if a new technology achieves sufficient relevance, one consequence of the social formatting of the new medium and the increasing necessity for legal control will be the emergence of new legal provisions that are better attuned to the logic of the new technology.

Denomination

After 1999 id Software impeded access to the Quake III engine's code. This fact plus the release of further games with mod possibilities like the FPS Unreal (1998) from Epic Games, or Half-Life (1998) from Valve Software, ended the sole reign of the Quake engine. Significant for popularizing Machinima was the choice of format. A milestone was the movie "Quad God" in 2000 from Tritin films, which for the first time was not only distributed in a demo file format, but also in a conventional video file format and could be viewed without the game engine. This no longer excluded a greater audience not in possession of the original computer game.

In the same year the naming machinima, occurred under the auspices of Hugh Hancock, cofounder of the Strange Company and the online platform www.machinima.com. Machinima is a made-up word from machine, cinema, and animation. So we can confirm the naming.

The next important step was connected with two computer games which offered better user friendliness for machinimators: The Sims 2 (2004) and The Movies (2005). Following an inquiry by Robert Jones these games increased fiftyfold the whole machinima production from 2004 to 2006, and female machinimators, which prior were hardly active, increased up to 50 percent. [7]

The innovation process brought further development of machinima and a variation of different technical and conceptual approaches. Machinimas differentiated in the distance to the games, which 2005 led to a discussion about machinima production. Paul Marino first distinguished inside-out from outside-in machinimas [8] and Phil Rice referred on this distinction talking about "Engine-Idea" and „Idea-Engine." [9]

Mostly widespread machinimas are inside-out productions. With regards to technique, visual style and content they heavily depend on the game on which basis new stories are told inside the game world as intertext or paratext relating to or as comment about the game. The filmic quality often takes a back seat in favor of central dialogs, which tend to parody, reference and joke. The genre, which audience mostly consists of players, develops with the games and functions as fan-fiction or textual poaching. [10]

After 2005 productions more concentrated on visual and narrative aspects outside the game world as well as better pre- and postproduction were increasingly released.

Outside-In productions differ from the visual game style and story. Here the game serves rather as a render engine. In contrast to the inside out method the visual concept has to be designed from scratch, assets have to be produced and more production time and experience with film and 3D graphic production is necessary.

Although there are interactive productions as well, like the Ill Clan's "Common Sence cooking" (Quake II), Chris Burke's "Spartan Life" (Halo2) or Friedrich Kirschners "Litte Puppet play" (Unreal Tournament, Moviesandbox) they are definitely a minority.

Looking for machinimas in commercial relations solely linear narrations with concepts from film and TV can be found.

Commercial Uses

The game and film industries use the popularity of machinima for advertising purposes, image building, and image cultivation, and organize product-specific competitions on a regular basis. One of the highest paying is the "Make something unreal contest," organized by Epic Games and Intel.

Major film and media art festivals offer a platform for machinima productions: Ars Electronica Animation Festival, the Bitfilm Festival, the Ottawa International Animation Festival, the Sundance Film Festival; the exclusive annual Machinima Film Festival by the Academy of Machinima Arts and Sciences and the annual MachinExpo.

Producers of machinima who emerged out of the game community have found commercial applications for their art. One of the longest existing groups, the Strange Company from Edinburgh, produced in 2003 "Tum Raider" for the BBC and Further projects for BAFTA, Scottish Television, and Electronic Arts. The ILL Clan from New York, works for MTV, Universal, Warner Brothers, NBC, and IBM. They create videos, commercials, and presentations for Web and television, including a spot for the TV series Two and a Half Men and machinima material for the TV series CSI: New York. Rooster Teeth Productions successfully sell DVD compilations of their famous machinima series "Red vs. Blue", a comedy series produced with Microsoft game studio's Halo from 2003 to 2007. Thus, machinima has grown far beyond the context in which it emerged and is today an economic factor in film and television productions and commercials.

The French Duran Animation Studio has so far produced two films that utilize mainly machinima technology: "Ugly Duckling" and Me and "Immortel". Steven Spielberg used the Unreal Tournament engine for preproduction of *A.I.* George Lucas also used the Unreal Tournament engine as a previs tool to plan sequences of his *Star Wars* films.

The advertising industry also discovered machinima. In 2004 Volvo produced the commercial Game:on with the Unreal Tournament engine, and OSRAM, manufacturer of lighting systems, used Second Life.

A variety of music videos are produced with machinima for example, the Zero7 video In the Waiting Line broadcast on MTV using the Quake engine, Suffer Well by Depeche Mode with Sims2.

Several TV formats integrate machinima. MTV2 produces the series Video Mods, which presents machinima music videos. For Time Commander the BBC History Channel used the Rome: Total War engine to reconstruct historic battles of the ancient Romans.

"Molotov Alva and His Search for the Creator: A Second Life Odyssey" a the documentary by Douglas Gayeton was commissioned by the Dutch television broadcaster VPRO in 2006, and shown successfully at various festivals. In 2008 Home Box Office, a subsidiary of Time Warner, bought the broadcasting rights for North America, although it had already premiered on YouTube. To be precisely Molotov Alva was not in game recorded but shot with a high quality camera from the screen.

So we see a variety of commercial applications of machinima.

Last but not least Machinima enables amateurs and fans to become producers of their own computer animated stories. Using a familiar visual and narrative form makes them easily accessible for others. Computer game fans so far produced and distributed many thousands machinima videos. At the same time the social, economic and material relations of production, reception and distribution change which forces the industry to react.

In times of media convergence industries change the way they operate and realized how to profit from the symbiotic relation to machinima in several ways. They reacted on the not predictable consumer needs and included easy to use tools for modifying and film production. This provides for selling content to consumers in multiple ways, strengthen consumer loyalty and in the end increases their attention, which might be the most important economic factor today.

Legal issues

Machinima opens the field of action to a broader circulation and participation, which is an important innovation stage and essential for achieving a professional level. A serious barrier is the legal uncertainty surrounding the issue that computer game engines are the intellectual property of their producer.

Some producers reacted on machinima's popularity with special licenses. Blizzard Entertainment's "Letter to the machinimators of the world" [11] licensed the limited use of World of Warcraft, and Microsoft Corporation published the "Microsoft's Game Content Usage Rules," [12] an unilateral license for limited use of the games to produce new derivative works. Moviestorm, IClone, VirtualStage are dedicated Machinima packages licensed for making commercial Machinimas. Linden Lab allows in their machinima policy to reproduce, distribute, modify, prepare derivative works of, display, and perform machinima captured in second life outside of Second Life in any current or future media. [13]

Licenses and a clear delineation ensure the legal position of machinima producers and also festival organizers will present more machinima productions if the legal aspects are not in dispute.

So following the approach with the denomination, commercial use and legal issues, we can prove a complete innovation phase – and therefore can see machinima as an independent medium or independent art form.

One aspect is against this view:

Both in inside-out and outside-in productions use highly interactive features of realtime 3D computer games for the production of established linear narratives, which reprocess concepts from film and TV.

In this regard there is a continuing discussion about the uniqueness of machinima as a new art and media form. The potential of machinima as a new medium consists in the procedural - performativ nature of the image and therefore the possibility of real-time production and presentation, which allows live presentations and audience interaction. [14] We have seen that the popular mode of production did not follow this feature. We also have seen that the success of machinima by emancipating from the game engine resulted in cultivating traditional media.

Machinima's strong association with linear narration and aesthetics of film can be criticized since the technology of computer game engines offers interactive potential as never before. However under the perspective of media evolution remediation **- the representation of one medium by another -** appears essential for achieving cultural and social acceptance which is required for a legal and economic frame that matches the new art technique. New art forms like Machinima are not purely product of their technical pre-conditions and artistic will, but in the same way dependent of their potential of meeting with prevailing, historical grown, established and learned conventions of seeing and media competences.

Remediation is not new in the world of art and media. Photography remediated painting and film remediated theatre before they established their own accepted visual and technical concepts. **New media technologies innovate in existing media ecologies [15] and may or may not be integrated dependent on their ability to complete or enhance the existing media forms. Therefore remediation strategically targets reform of its antecessor driven by a new technical possibility. In the case of machinima this counts** more on the process of production than of reception.

Refering to film critic Bèla Balàzs Michael Pigott emphasizes that a new use of form only slowly comes into existence by a negotiation process between artist, medium and audience, which ultimately follows the possibility of communication. [16] The challenge of the artist to develop a new form is accompanied by the probably harder challenge of the audience to understand and accept it.

Although the criticism that, in most cases, highly interactive features of realtime 3D computer games are used to produce conventional linear narratives is correct, we should not overlook the necessity of this step. Machinima shows clearly that media evolution is a process where reference to older media is not a constraint but instead it is necessary for development because it enables increasing popularity and further economic applications and changes to legal structures.

At the moment it is not clear which economically viable forms will emerge out of Machinima, so we shall have to keep on observing which new applications that already exist on an experimental level will become established.

References and Notes:

1. Henry Lowood and Michael Nitsche, eds., The Machinima Reader (Cambridge, MA: MIT Press, 2011).
2. Katie Salen, "Arrested Development: Why Machinima Can't (or Shouldn't) Grow Up," in The Machinima Reader, eds. Henry Lowood and Michael Nitsche, 37-51(Cambridge, MA: MIT Press, 2011).
3. Michael Nitsche, "Machinima as Media," in The Machinima Reader, eds. Henry Lowood and Michael Nitsche, 91-111 (Cambridge, MA: MIT Press, 2011).
4. Jay David Bolter and Richard Grusin, Remediation: Understanding New Media(Cambridge, MA: MIT Press, 2001).
5. Joseph Alois Schumpeter, Theorie der Wirtschaftlichen Entwicklung (Berlin: Duncker&Humblot, 1997).
6. Everett M. Rogers, Diffusion of Innovations (New York: Free Press, 2003).
7. Following an inquiry of Robert Jones with The Sims 2 also a significant increase up to 50 % of female machinimators, which prior were hardly active, took place. See: Robert Jones, "Pink vx. Blue: The Emergence of Women in Machinima," in The Machinima Reader, eds. Henry Lowood and Michael Nitsche,295 (Cambridge, MA: MIT Press, 2011).
8. Hugh Schofield, "New Internet Piracy Law Comes into Effect in France," BBC News, December 31, 2009, http:// news.bbc.co.uk/2/hi/ europe/8436745.stm (accessed January 1, 2010).
9. Paul Marino, Machinima from the inside out ..., „ Thinking Machinima, October 9, 2005, http:// blog.machinima.org/2005/10/machinima-from-inside-out.html (accessed June 6, 2011).
10. Phil Rice, "The Chicken Or The Engine," Zarathustra Studios Blog, April 20, 2006, http://z-studios. com/blog/2006/04/20/the-chicken-or-the-engine.html(accessed March 23, 2008).
11. Henry Jenkins, Fans, Bloggers, and Gamers: Exploring Participatory Culture(New York: New York University Press, 2006), 1-5.
12. Blizzard Entertainment, "Letter to the Finmachinimators of the World", World of Warcraft Web Site, http://www.worldofwarcraft.com/community/Machinima/letter.html (accessed March 3, 2009).
13. Microsoft, "Game Content Usage Rules," Xbox.com, http://www.xbox.com/en-US/community/ developer/rules.htm (accessed March 12, 2009).
14. Linden Lab, "Snapshot and Machinima Policy," wiki.secondlife.com, http://wiki.secondlife.com/ wiki/Linden_Lab_Official:Snapshot_and_machinima_policy (accessed June 19, 2011)
15. See for example: Common Sence Cooking (Ill Clan, 2003) http://www.archive.org/details/ common_sense_cooking (accessed June 19, 2011).
16. Jo A. Tacchi, J., "Art International, Studying Communicative Ecologies: An Tehnographic Approach to Information and Communication Technologies"(paper presented at the 56th Annual Conference of the International Communication Association, Dresden, June 19-23, 2006), http:// eprints.qut.edu.au/4400/ (accessed May 14, 2011).
17. Michael Pigott: "How Do you Solve a Problem like Machinima?" in The Machinima Reader, eds. Henry Lowood and Michael Nitsche, 295 (Cambridge, MA: MIT Press, 2011).

THE MAKING OF DIAMANDINI: PERCEPTION, IDENTIFICATION, EMOTIONAL ACTIVATION DURING HUMAN-ROBOT INTERACTION

Mari Velonaki

This paper presents Mari Velonaki's new project, the humanoid robot 'Diamandini'. Diamandini is a five-year collaborative research project conducted by Mari and robotics scientists at the Centre for Social Robotics, ACFR, the University of Sydney. The project aims to investigate intimate human-robot interactions in order to develop an understanding of the physicality that is possible and acceptable between a human and a robot.

Diamandini, 2010-2013, Mari Velonaki, Interactive robotic installation, 155cm high.

In this paper I will discuss what led me to the creation of my new robot Diamandini – the road to Diamandini.

I am a media artist/researcher who has created interactive installations over the last 15 years. I have always been interested in creating 'characters' – either projected, or as three-dimensional kinetic objects

that inhabit an installation space. Since 2003 I have been working as a senior investigator in collaboration with robotics scientists at the Centre for Social Robotics / Australian Centre for Field Robotics (ACFR) at the University of Sydney, Australia.

THE "FISH-BIRD" PROJECT

In 2003 I started working at ACFR, leading a research team to develop the "Fish-Bird" project. This was an interdisciplinary project that involved the creation of novel interfaces for human-robot interaction, experimentation in distributed sensory systems and robot 'perception'. "Fish-Bird" is an interactive autokinetic artwork that investigates the dialogical possibilities between two robots, in the form of wheelchairs, that can communicate with each other and with their audience through the modalities of movement and written text. The chairs write intimate letters on the floor, impersonating two characters (Fish and Bird) who fall in love but cannot be together due to "technical" difficulties.

The most important thing that we learned from the Fish-Bird project in relation to human-robot interaction, after 35,000 recorded encounters in five countries is that Behaviour is more important than Appearance. Although Fish and Bird have the utilitarian appearance of an assistive device, participants were drawn to them because of the way they move and interact physically with them, and because of the handwritten style 'personal' messages that they print for their audience.

DIAMANDINI

With Diamandini, I wanted to make a new robot that would take this experimentation further, adding the element of interaction via touch. It was important that the interaction be one-to-one: one human, one robot.

The Greek word for interactive transliterates as amphi-dromos (amphi: around on both sides of, dromos: street or road). Thus it is defined as a middle point where two roads meet. In English, the preposition 'inter' means 'between' or 'among'. Inter-action, therefore, signifies between or among actions. A meeting point beyond action and reaction and prior to discourse, a brief moment of recognition between two parties. In this meeting point of recognition and identification I intend to use the moment as a stage to test if intimate human-to-human interactions can serve as an analogue for human-to-robot interactions.

The original intent of the Diamandini project was to create a robot that was non-representational and non-anthropomorphic. As I started experimenting with a variety of abstract sculptural forms, although interesting in shape and structure, as the artist/creator I found it extremely difficult to assign behaviours to them that could lead to emotional activation of the spectator/participant.

With Fish and Bird, although the wheel chair robots are certainly not anthropomorphic, it was inevitable for the participants to assign personalities to what was not there, since a wheel chair is a socially charged object that signifies the absence or the presence of a person. The dialogues expressed in written text between the two characters in Fish-Bird and the storyline further assisted the participants to feel a momentary connection to the Fish and Bird characters.

These considerations influenced my decision to create a humanoid robot. This was a challenging decision, especially when I had to decide how the robot should look. I didn't want Diamandini to have a typical humanoid robot aesthetic. After a long period of reflection I began to think of Diamandini as a female sculpture. In my mind Diamandini had a diachronic face that spans between centuries, a style that could be reminiscent of post-World War II fashion influences, and at the same time with futuristic undertones.

Diamandini is small - only 155 cm high. I wanted her figure to be small and slender so that people didn't feel threatened by her when she 'floats' in the installation space. I wanted her to look youthful, but not like a child, and for her age not to be easily identifiable. Interestingly, in my mind she is between 20 to 35 years old. Because I am a woman I feel more comfortable working with a female rather than a male representation.

Diamandini's construction was a multi-stage process, involving a sculptured prototype terracotta head, a custom-tailored fabric dress made over a wooden armature, high precision 3-dimensional laser scanning and manipulation of the scanned data, followed by computer-aided design (DAC) modelling. Diamandini's external shell was made using stereolithography – an additive manufacturing process that uses computer-controlled UV lasers to polymerise a resin. Of course, the skeleton, muscles, blood and organs were designed by my roboticist collaborator David Rye together with Mark Calleija and Cedric Wohlleber.

I imagine spectators entering the installation space to see Diamandini moving in a smooth, choreographed manner. How Diamandini behaves towards her visitors depends on factors such as time spent with her, proximity to her, and Diamandini's perception of the body language of the participants.

The dialogical approach taken in this project both requires and fosters notions of trust and shared intimacy. It is intended that the technology created for the project is invisible to the audience. Going further than a willing suspension of disbelief, a lack of audience perception of the underlying technological apparatus focuses attention on the poetics and aesthetics of the artwork and promotes a deeper psychological and/or experimental involvement of the participant/viewer. For me as an artist, the challenge is to create a female humanoid robot that simply does not resemble a female humanoid robot. When people first meet Diamandini I want them to experience a new aesthetic approach to what a robot can be. I want to intrigue them as to how a robot can behave. I strive to create a robot that doesn't look or behave like a 'robot'.

We live in a technology-driven world. I didn't create Diamandini to proselytise for robots in one's living room, yet as robots rapidly emerge from laboratories into society, my role as an artist (I am tempted to say) is to question, to provoke and hopefully to inspire.

This paper has described Diamandini in the first stage of the project. The next stage will involve articulation and actuation of her arms, kinetic autonomy of motion including tilting of her body, interaction and reaction via touch and generated text. In the next version, Diamandini will be covered in a light blue porcelain-like material, giving her the appearance of a floating porcelain figurine in the installation space.

DIGITAL MATERIALITY – MAKING THE UNGRASPABLE (UNBEGREIFLICHE) PERCEPTIBLE

Eva Verhoeven

This paper reports on a series of experiments that were conducted as part of a practice-led PhD, which explored the digital potentials at the interface of hardware and software through creative practice. The laboratory-style experiments develop along a trajectory from noise within existent (computer) systems towards speculative interfaces, where conceptions of materiality of hardware and software are brought into question.
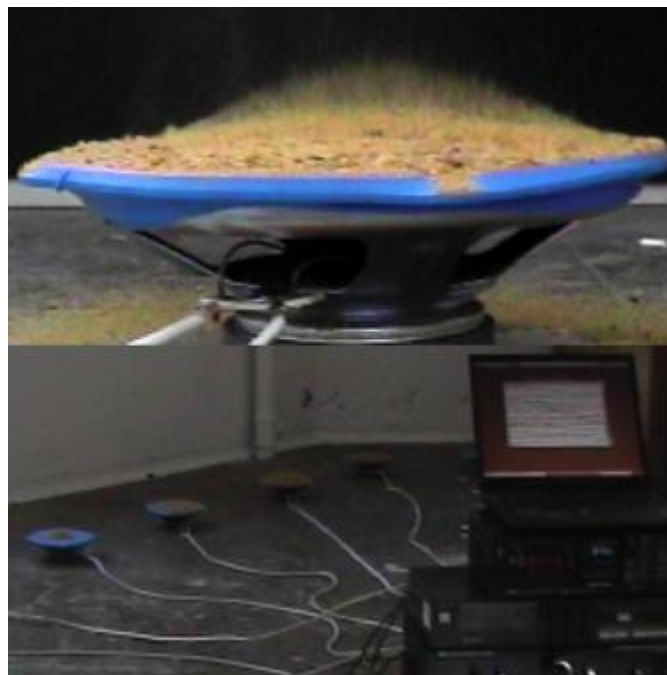
Digital Transformations - Sand.

How do we conceive of contemporary Digital Culture? More specifically, how do the concepts of time and matter offered by digital technologies relay into culture and produce present conceptions of Digital Culture? And what methods and strategies can be applied to challenge dominant conceptions of it? Is it possible, for example, to think of and to produce the interface of software and hardware differently?

These were some of the questions I investigated as part of my practice-led PhD, which explored the digital potentials at the interface of hardware and software through creative practice. The research focused on this interface specifically, because it is potentially problematic in the context of conceptions of the digital as immaterial.

This paper reports on a series of laboratory-style experiments that were conductedalong a trajectory from noise within existent (computer) systems towards more speculative interfaces, where conceptions of materiality of hardware and software are brought into question.

Digital processes are omnipresent and yet remain imperceptible and ungraspable (unbegreiflich). Unlike mechanical devices, which can be opened up and inspected, the processes of digital devices take place beyond human perception – leading to them being easily (mis)understood as immaterial. That which is incomprehensible can also be described as ungraspable (or unbegreiflich in German). Understanding and comprehension can and often does work through a tactile process and has something to do with being able to grasp or grab something – comprehension can be a physical process.

In terms of technological developments, the concept of information as immaterial was already discussed during the Macy conferences in the 1940s and 1950s in the US. The Macy conferences were interdisciplinary events, attended by mathematicians, engineers, anthropologists, biologists, psychologists, neuroscientists and sociologists. Katherine Hayles identifies the Macy conferences as being crucial in the development of the conceptions of 'bodiless information.' [1] During the first Macy conference in 1946, information was already a dominant concept and, as Hayles argues, Claude Shannon's theory – although only meant to be used within communication engineering and not as a universally applicable theory of information – contributed to the construction of the idea of information without a body by making information a mathematical function that did not need a material base to be send from sender to receiver: "frequently the messages have meaning; that is they refer to or are correlated according to some system with certain physical principles or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem." [2]

What was a breakthrough for communication engineering, was, as Hayles argues, a step back for its relay into culture because, when understood outside of a communication engineering context, "the definition allowed information to be conceptualized as if it were an entity that can flow unchanged between different material substrates." [3] Hayles points out that the definition of information taken out of its communication engineering context had a strong influence on, for example, Hans Moravec's vision of downloading human consciousness into a computer, Norbert Wiener's suggestion that it was theoretically possible to telegraph a human being and also the producers of Star Trek, whose method of transport required dematerialisation and rematerialisation of the body without a change to the material itself. According to Hayles, this cultural conception of information without a body does not stop at early cybernetic theories or sci-fi of the late 1960s, but continues for example, in current molecular biology that understands the genetic DNA information as the key to the human body, making the idea of bodiless information a thoroughly contemporary phenomenon.

Since the implementation of the von Neuman architecture, which makes software and data interchangeable, it can be argued that the development of software took place within the framework of bodiless information and highlights the cultural conception of the division between hardware, or material substrate, and software, or immaterial (bodiless) element. Software as data is largely conceived of as an immaterial entity that can flow freely and without any material boundaries between material substrates. The German computer scientist Friedrich L. Bauer exemplifies this hierarchy of immaterial software over hardware in the following quote: "How did a few people come to construct software? Roughly speaking, it was an attempt to compensate for the inadequacies of the hardware by using programmed features – in many cases features that hardware designers had forgotten or had not even thought to provide for." [4]

Variations of this dualism can be found in much of western history. This paradigm of the digital immaterial however is highly problematic, and challenging it becomes particularly important in the light of relays between technological developments and cultural concepts that develop into so-called Digital culture.

Friedrich Kittler constructs a counter argument to the software/hardware dualism and argues that 'there is no software' in the as such titled essay. Computer languages exist on several layers, from the HCI and application software to simple operation codes, which exist as hardware configurations in the form of silicon chips. For Kittler everything that is digitally produced exists as binary data and voltages. If one magnifies the process of descent from software to hardware, one finds "signifiers of voltage differences," which strongly suggests that there is no software without hardware –that "software does not exist as a machine independent faculty." [5] This describes a much more ambiguous relationship between hardware and software.

This is the context within which a series of experiments was constructed. Creative practice and in particular critical practice has a particular position from which to challenge existing paradigms – it uses speculative propositions to challenge existing ideas and assumptions; it asks questions rather than giving answers. The experiment here was not used in the strictly normative scientific method – rather the experiment in the context of speculative and critical practice enables a continuous and open-ended process of evolvement and invention. The experiment here also celebrates the constructedness of the pseudo scientific laboratory – it plays with the rational approach to classical science and the potential fictional aspect of the constructed scientific experiment.

The series of experiments were set out to challenge and to question the hardware/software dualism. They attempt to challenge the materiality of the digital, and more specifically the 'softness' of software. They make use of the von Neumann architecture that treats software and data the same. The operating system and the application software (as data) is piped to the parallel port, where the ungraspable (unbegreiflich) process of software becomes perceptible as voltages. In the series of experiments this is amplified and materialized using a range of different materials. Through different processes software is transformed into perceptible (and literally graspable) dynamic matter.

References and Notes:

1. *Katherine Hayles, How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics (Chicago: University of Chicago Press, 1999).*
2. *Claude Shannon, "A Mathematical Theory of Communication," in The Bell Systems Technical Journal 27, no. 3 (1948): 379-423.*
3. *Katherine Hayles, How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics (Chicago: The University of Chicago Press, 1999), 54.*
4. *Friedrich Bauer, "A Computer Pioneer's Talk: Pioneering Work in Software During the 50s in Central Europe," in ICHC Proceedings of the International Conference on History of Computing: Software Issues, eds. Ulf Hashagen et al., 11-22 (New York: Springer, 2002).*
5. *Friedrich Kittler, "There is No Software," in Literature, Media, Information Systems (Amsterdam: OPA, 1997), 151.*

LIFE-LOG-ART

Lenara Verle

In an overly connected and digitized world, privacy becomes a privilege, and many people renounce to this privilege in a voluntary and purposeful way. By design or by accident, the private life becomes a work of performance art. What can we do, and can be done to us, with this growing digital memory? Some of these questions are raised by the works of a range of contemporary artists exploring the theme of lifelogging.

The 2010 Feltron Annual Report, by Nicholas Felton.

Recording information about one's life is not a new activity. Journals, correspondence, pictures and other forms of registering our life events have existed for quite a while and have enjoyed great popularity. As the time passes, new technologies for gathering and registering data are created, and the amount of information being logged seems to grow almost exponentially, some of it being purposefully recorded by ourselves, and some of it being logged in an almost automatic way by devices surrounding us.

What can we do, and can be done to us, with this growing digital memory? Some of these questions are raised by the works of a range of contemporary artists exploring the theme of lifelogging.

The records we create of our life have the role of a memory outside the self, an external storage beyond the one in our brains. While the features of our biological memory system were long determined by evolution, we are now defining the features of this new digital, additional memory. How much to record

and from what sources? How to extract meaning from the data, how to filter the memories? How to create meaning with the data, to connect and reach out? Who to grant access to, and share our memories with?

The artist and designer Nicholas Felton creates beautiful graphics from personal data. In 2010 he designed a special printed report after his father's death. According to him it represented "an encapsulation of my father's life, as communicated by the calendars, slides and other artifacts in my possession." [1] All of them analog records, from calendar entries to toll receipts, they already displayed a tendency to grow more abundant each decade. Felton diligently sorted thorough all of them and rendered the information he deemed interesting into well-designed pie charts, line graphics and tables of numbers, adorned by selected images. He has been creating a yearly report about his own life since 2005, following many of the data trails his computer and devices create about himself, and in 2009 he started handing out requests to every person with whom he had a meaningful encounter to submit a record of their meeting through an online survey. [2] He also created a software called Daytum to help others log and graph similar data. It is one of the many tools available to try to extract meaning from digital memories.

The website quantifiedself.com was also created for people who are logging many different aspects of their lives. One of its founders, Gary Wolf, talks about the motivation behind loggers: "For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask." [3]

If many people are purposefully tracking and registering their daily lives, and choosing how to display and share this information, some are surprised when they discover they are leaving trails in the digital world, and worried about who has access to this data. The digital tools make many tasks easier and faster, but often come with the cost of reduced privacy.

Hasan Elahi is a bangladeshi-born artist that has been documenting his life openly since 2002, when the FBI mistook him for a terrorist. He posts pictures of every meal he has, every purchase he makes, all the travels he takes, his current location, and many other types of information on his website trackingtransience.net. His life has become a sort of performance art, and thousands of people, including FBI agents, access his site. According to an interview he gave in 2007, he hopes they eventually lose interest, and "he figures the day is coming when so many people shove so much personal data online that it will put Big Brother out of business." [4]

The Big Brother nowadays is not only found working for the government but also inside corporations making their business collecting and selling our personal data. Google's mission to "don't be evil" is also a recognition that if only they wanted, they could be. Most of our personal information including emails, pictures and all sorts of tidbits is increasingly online at services provided by corporations, Google and Microsoft currently being two of the biggest ones.

In a culture growing accustomed to the benefits of abundant, convenient and fast digital tools, many agree with Elahi and are not afraid of opening up their lives to the world. Some are aiming to extract and create meaning from digital memories, to find beauty in mundane moments. New forms of art expression are being experimented with. A couple in Seattle attached a camera to their cat Cooper and posted a selection of pictures online, which attracted many admirers and are now for sale. According to Copper's owner, the photographs taken automatically by the cat's camera surprised him: "It's interesting

that something completely arbitrary can have such a beautiful result. It really changed my view on what art is, how it can be conceived and how it's interpreted." [5]

Life as art is not a concept exclusive to the digital technologies, the novelty they bring being maybe the opportunity and tools for more people to become life-loggers, and to generate forms of life-log-art. According to Gary Wolf, four things were fundamental in this process: "First, electronic sensors got smaller and better. Second, people started carrying powerful computing devices, typically disguised as mobile phones. Third, social media made it seem normal to share everything. And fourth, we began to get an inkling of the rise of a global superintelligence known as the cloud." [3]

Among the challenges the digital format poses for art, one is the conservation of a medium so dependent on constantly evolving hardware and software that, at the same time it opens new possibilities for experimentation, is rendering old pieces fast obsolete. Gordon Bell, a key-figure in computing and a prolific lifelogger who succeeded in digitizing most of his life, worries about it: "Another technical challenge will be ensuring that users are able to open their digital files decades after storing them. We have already run into cases where we could not access documents because their formats were obsolete. Digital archivists will have to constantly convert their files to the latest formats." [6] Bell's colleague Jim Gemmel is also a lifelogger and sees his extended digital memory as part of himself: "one day, Gemmell's hard drive crashed, and he hadn't backed up in four months. When he got his MyLifeBits back up and running, the hole that had been punched in his memories was palpable, even painful. [...] He was amazed to realize his backup brain was no longer some novelty but a regular part of his psychological landscape." [7]

We are faced with the question of what shall we record, and the answer seems increasingly to be "everything". Even though most of it will get filtered out, mashed up together and consolidated into new forms, simply forgotten, or maybe fallen victim of obsolescence, purposefully or accidentally. It's all part of our new challenging digitized lives.

References and Notes:

1. *Nicholas Felton, "The 2010 Feltron Annual Report," Feltron Web Site, http://feltron.com/ar10_01.html (accessed May 9, 2011).*
2. *Nick Bilton, "An Annual Report on One Man's Life," New York Times, February 9, 2010, http://nyti.ms/rebFwU (accessed May 9, 2011).*
3. *Gary Wolf, "The Data-Driven Life," The New York Times, April 28, 2010, http://nyti.ms/n3WZ4Q (accessed May 9, 2011).*
4. *Clive Thompson, "The Visible Man," Wired Magazine, May 22, 2007, http://shar.es/bwgxN (accessed May 9, 2011).*
5. *Suzie Rugh, "Cat-Vision as Art," Seattle Weekly, November 19, 2008, http://goo.gl/D5lVg (accessed May 9, 2011).*
6. *Gordon Bell and Jim Gemmell, "A Digital Life," Scientific American, February 18, 2007, http://goo.gl/R2T0A (accessed May 9, 2011).*
7. *Scott Carlson, "On The Record, All the Time," The Chronicle of Higher Education, February 9, 2007, http://goo.gl/Q9rLO (accessed May 9, 2011).*

IMAGINING THE SOCIAL CHANGE: NEW MEDIA IN CZECH ART DISCOURSE IN THE 1990'S

Jindra Veselska

This paper focuses on the emergence of new media in Czech discourse about contemporary art in 1990s. It works with specialized art journals and exhibition catalogues from 1990 to 1999 with the focus on narrative of information revolution in context of then social and political transformation.

Although usually considered in the context of artworks, imagination, in this paper, is taken into account as a part of the discourse about new media art. [1] As such it is restored on the basis of documents written in that era and considered as providing a horizon for practices of shaping the identity of new media art in the Czech Republic in the nineties. As I will point out, certain recurring discursive practices, which (re)appear in the situation of a technological change throughout media history, can be uncovered in the Czech art discourse this way.

In doing so, my approach combines the discourse theory with archaeology of media, since the latter is characterized as studying "recurring cyclical phenomena that (re)appear and disappear and reappear over and again in media history", while focusing especially on discourses „that guide and mould its development, rather in the 'things' and 'artifacts.'" [2] Archaeological perspective on media history allows us to focus on systems of statements in their own right and historical conditions that defined the discursive space. Even though the visions attributed to a new medium might seem exaggerated or even foolish at first sight, they are not considered here from the normative perspective as false or banal statements, because for the archaeology the originality/banality opposition is not relevant since it establishes no hierarchy of value. Rather than treating them from the perspective of their possible realization and the discrepancy between them and reality, which would mean overlooking the importance of their repetitive character, this paper focuses on the circumstances and relations that constitute them.

Combining the archaeological approach with Ernesto Laclau's and Chantal Mouffe's concept of discursive as social [3] [4] enables us to look on this 'recurring cyclical phenomenon' as a social practice. It also takes us to the point where we interpret these practices as (re)activated throughout media (art) history rather than cyclically (re)appearing. [2]

Looking perspectively at how media history was articulated, it becomes apparent that the term 'new technologies' is in fact a historical term. This is the case especially with the concept of new media, since no general definition was actually settled in the Czech media art discourse in the '90s, and the limitation of this concept is still ambiguous. At the beginning of the nineties the concept of new media was used for digital technologies that have emerged after television (while television was considered a traditional medium) such as interactive installations and videoart, but in the mid-nineties the concept was extended to ICT technologies and the Internet.

Soon after the revolutionary year of 1989 and since the beginning of the 1990s, there occurred a visible tendency in the Czech discourse to see the new media as one of the tools that would assist in overcoming the past totalitarian regime and also help with establishing the regained democratic system. In this enthusiastic atmosphere much hope was placed on the new media, expected to facilitate a radical social change. Regarding the social field of the contemporary art of the era, these expectations were located within the Soros Centre for Contemporary Art (SCCA) that was founded in Prague in September 1992 as a part of a network of twenty centres located in the capital cities of the former Communist countries in Central and Eastern Europe. The centres were founded not only to provide support for the new media art activities within the field of contemporary art, but also in order to introduce the Internet to general public.

According to its director at that time, Ludvík Hlavacek, the SCCA aimed to put visual arts back in the centre of social life. In doing so, the centre placed a particular emphasis on the new media in contemporary art, as they were supposed to introduce a new model of social relationships into the art world. In the mid 1990s, the SCCA organized an exhibition entitled 'Orbis Fictus. New Media in Contemporary Art'. In the texts that were written for the exhibition catalogue, the assumption of radical social change brought about by new technology is almost taken for granted. Here the art was largely viewed as a form of mediated communication between the author and the viewer, and many hopes were placed on its interactivity, enabling viewers to participate in the work of art, as well as on the possibility that through the Internet, it can be spread directly to the audience all over the world. Museums and galleries were no longer considered suitable for presenting this art. The new media were presented as a *democratic* improvement of the older *passive* media. They appeared to hold the opportunity for a new, more open and democratic communication, but this 'communicative, creative and critical potential' was supposed to be able to reveal its form only as media art, otherwise it would have yielded to economic, military and political pressures. [5]

It has been already recognized by Walter Benjamin that this utopian vision of a social change delivered by the fusion of art and technology is not new at all. It is actually a certain amount of discursive practices that evokes old utopias, dreams and myths, presenting them as new over and over again.

In order to be able to emphasise the newness of the new technology, first of all there has to be some kind of relationship created with the old one, in order to constitute the possibility of a revolutionary rupture with the past. Using the already existing technology of television that had already worked in numerous meaning systems, the new media was presented in the Czech discourse as more valuable and promising than the existing technology. The new technology was actually conceptualized through the opposition of old and new, which, as every binary opposition, embraces a hierarchy. In other words, the new technologies' identity was constituted through establishing a hierarchy within the discourse structure. Based on this hierarchy, the old technologies were marked as traditional, passive, old-fashioned, while the space for promising new media was being created.

Regarding the Ernesto Laclau's theory of discourse, the essential point here is his concept of discourse as a field of the social in which different political projects strive to articulate a greater number of social signifiers around themselves. [4] The moment of political transformation from totalitarian to democratic regime in the Czech Republic in the 1990s, when a democratic social order was being established, was beneficial to the reappearance of myths and utopias. In this euphoric but also very chaotic atmosphere the whole field of contemporary art was being repaired and restructured after fifty years of censorship and state control of art institutions. This historical situation was met with the emergence of new media

and in order to give them a significant and dominant articulation within a specialized discourse of contemporary art, these promises of possible new social order delivered by new media art were reactivated. Since the myths function as a surface on which social demands can be inscribed, they were useful in articulating the identity of new media, according to particular projects within the (re)constitution of the field of Czech contemporary art after 1989. However, while the promises such as 'building a bridge between the contemporary art and the public' were being proliferated, the new media was actually held back by this conventional imagination of myths and utopias that had already been well known. On the one hand new media's potential for radical social change was emphasised, on the other hand (re)activated discursive practices fitted it into old schemas.

References and Notes:

1. *This paper was written with the support from Grant Agency of Charles University in Prague.*
2. *Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Notes toward an Archeology of Media," Leonardo 30, no.3 (1997): 221-224.*
3. *Ernesto Laclau and Chantal Mouffe, Hegemony and Socialist Strategy: Towards a Radical Democratic Politics (London: Verso, 1985).*
4. *Ernesto Laclau, New Reflections on the Revolution of Our Time, (London-New York: Verso, 1990).*
5. *Andreas Ströhl, "Flusser and Beyond. Communication Philosophy, Media Art and Media Theory at the Prague Goethe Institut", in Orbis Fictus: Nova Media v Soucasnem Umeni, ed. Ludvik Hlavacek and Marta Smolikova, 133-140(Praha: Sorosovo Centrum Soucasneho Umeni, 1996).*

MORPHOGENESIS

Christophe Viau

Art and biology can be a natural fit. Some artists explore Artificial Life (Alife art). But morphogenetic art is a least known trend, interested in geometric structures derived from the observation of nature. Both approaches have common roots, but also great methodological and epistemological differences. A more precise definition of morphogenetic art will help understand how biology can provide strategies for creation.
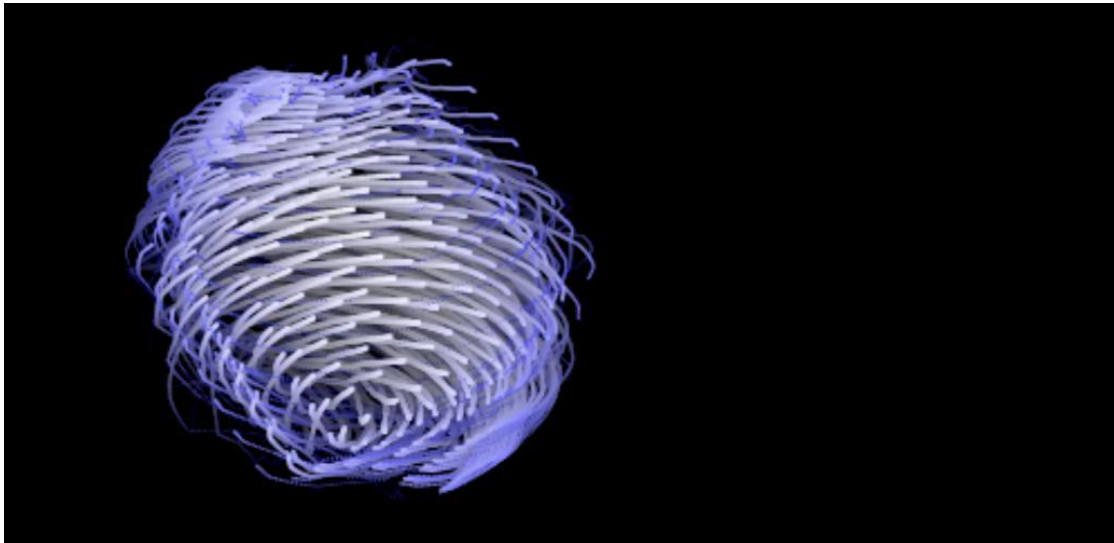
fig 1. GenomaLabs experimentation. Part of the Genoma project developed at the LabMIS, Museu da Imagem e do Som, São Paulo, Brazil.
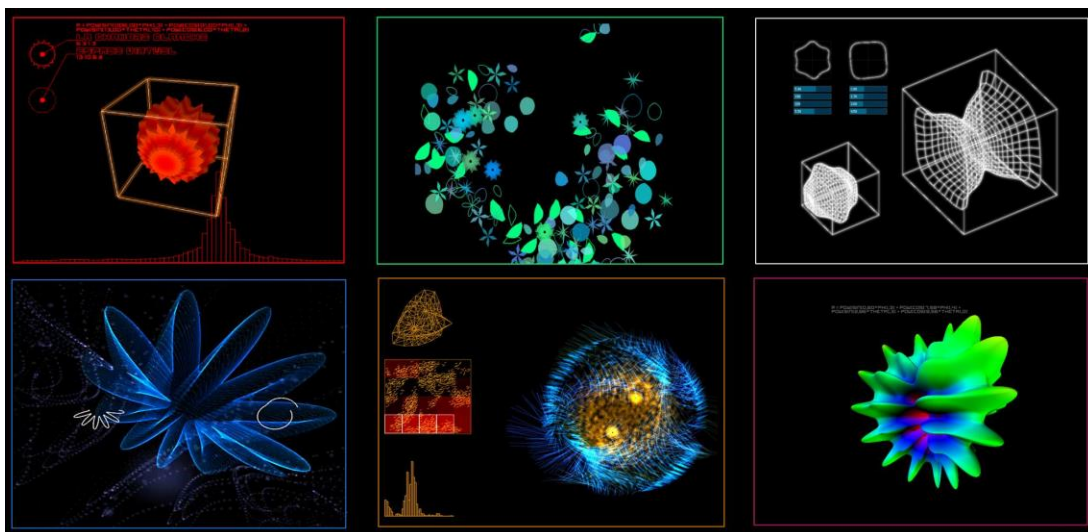
fig 2. Six experiments from the Spherical Series: Spherical Product, Genoma.Mercato, CAMC, Orbs, Genoma and Spherical harmonics.

Defining Morphogenetic Art

Generative art inspired by natural patterns and growth mechanisms can be named "morphogenetic art." To better define morphogenetic art as a blend of art, geometry and biology, we must first describe what is morphogenesis, a subfield of biology closely related to Artificial Life (Alife).

MORPHOGENESIS AND GEOMETRY

Morphogenesis is "the ensemble of mechanisms underlying the reproducible formation of patterns and structures and controlling their shape." [1] As a subfield of biology, it refers mainly to growth patterns in living organisms. Elegant equations can describe patterns as diverse as crystal configurations, spots on a fur, the texture of a horn or the arrangement of leaves on a stem. For example, the Fibonacci sequence, related to the golden ratio, named after an Italian mathematician of the 12th century but already known from the Indian mathematicians since the 6th century, is used to describe spirals found in nature, like from the unfolding of a fern, the arrangement of seeds and petals, etc.

Geometry helps to find the common roots of seemingly unrelated manifestations. For example, an ellipse can be defined by an equation. A mathematician called Lamé, in the 19th century, generalized this equation to describe an ellipse, a circle and a rectangle at once. This equation called "superellipse" was further generalized by Gielis, extending it for example to radial symmetry. This "superformula," published in 2003, [2] encompasses a lot of different natural forms from fruits and flowers to butterflies. Other equations such as spherical harmonics, minimal surfaces and reaction-diffusion systems are used in fields as diverse as atomic physics, geology, fluid mechanics, botany and chemistry.

Classical morphogenesis mainly tries to grasp the principles behind pattern formation and not the actual mechanisms of growth, that can be very complex and hard to modelize. For example, a few dozens of models can be found in the literature to explain the same arrangement of leaves on a plant stem, the main study of a field called "phyllotaxis." But some dynamic processes are more easy to formalize than others, giving some clues to help find the actual mechanisms that could be involved in the formation of certain patterns. Morphogenesis is therefore working on a purely geometric level only to describe forms and formation patterns, regardless of the causes governing the generation of these patterns in nature. In the words of René Thom, one of the great thinkers of morphogenesis:

"That we can construct an abstract, purely geometrical theory of morphogenesis, independent of the substrate of forms and the nature of the forces that create them, might seem difficult to believe, especially for the seasoned experimentalist used to working with living matter and always struggling with an elusive reality. This idea is not new and can be found almost explicitly in D'Arcy Thompson classical book On Growth and Form [...]." [3]

D'Arcy Thompson, with his book *On growth and form,* [4] is often considered as the father of morphogenesis. But the term is already used in a fundamental book by Leduc, from 1912, called *La biologie synthétique*. We will see that his experiments in generation of forms illustrate the common roots between morphogenesis and Alife.

SYNTHETIC BIOLOGY AND ARTIFICIAL LIFE

The fundamental experiments of Leduc [5] showed that shapes, patterns and behaviours previously associated with life can appear as a result of complex physico-chemical conditions. He generated fascinating moving and evolving organic shapes with drops of ink in metallic salts and alkaline silicates medium showing "the molecular forces brought into play by solutions, osmosis, diffusion, cohesion, and crystallization." These artificial creatures were looking like "flowers and seed-capsules," "most remarkable fungus-like forms," "capsules or closed shells," "amoeba," "a free swimming organism, a transparent bell-like form with an undulating fringe, like a medusa." These artifical creatures illustrated an approach in the study of life called "synthetic biology."

Other leading scientists contributed to this approach. Turing, forty years later in his seminal paper on morphogenesis by reaction-diffusion, suggested that "a system of chemical substances, called morphogens, reacting together and diffusing through a tissue, is adequate to account for the main phenomena of morphogenesis." [6] Leduc and Turing shared the same idea: if some fundamental patterns, shapes and behaviours can be synthesized by physico-chemical reactions on inorganic elements, life could have emerged from the organization of matter. We find an echo of this idea in the foundation of Artificial Life. As Langton, an important founder of the field, describes it: "Artificial Life (AL) is a relatively new field employing a synthetic approach to the study of life-as-it-could-be. It views life as a property of the organization of matter, rather than a property of the matter which is so organized." [7] Life is thus an emergent property of matter.

Morphogenesis avoids debates between mechanistic and vitalistic and other fundamental positions about what life really is. But it shares with Alife and with synthetic biology the idea that characteristics of life can often appear in the field of the non-living. Picking only one example, a dune of sand forms a complex system where grains of sand are driven by the wind but are also altering the dynamics of the wind. [1] The typical morphology of an isolated dune takes under constant wind is called a "barchan," It's a crescent shape sand ridge with the two horns pointing downwind, with the upwind side at 15 degree and the downwind slope (called "slip face") at 35 degrees. This precise configuration is invariant with size, moves at a defined speed under favorable conditions without loosing its shape, can "die" if deprived from new sand carried by the wind, and can even reproduce by splitting in two little barchans while colliding and fusing with another barchan! Self-organization, dependance to external conditions and supply, constance of the shape, birth, death, predation, motion, reproduction, collective behaviour, are all characteristics of life that have their manifestations in the inorganic world. Like Leduc says: "All the supposed attributes of life are found also outside living organisms. Life is constituted by the association of physico-chemical phenomena, their harmonious grouping and succession. Harmony is a condition of life."

Another shared observation is that simple principles can produce complex manifestations. One example is cellular automaton. For example, in the well-known implementation from Conway called "Game of life," [8] the environment is a grid composed of cells that can be in one of two states: alive or dead, represented by a black or a white cell. Simple rules guide each individual cells. At each step, each cell counts its number of neighbours and follows three rules: 1) a living cell will die by loneliness if surrounded by less than two neighbours and by overcrowding if surrounded by more than three. 2) A living cell will survive if surrounded by two or three neighbours. 3) A dead cell will come alive if surrounded by three neighbours. These three simple rules give rise to a lot of different patterns, like stable periodic forms with evocative names as "sparkers," "guns," "spaceships," "puffers" and complicated combinations like "glider-to-spaceship converters." Cellular automaton mechanisms have been recognised among other morphogenetic processes in the colored patterns of sea shells, in urban growth models and chemical systems.

DEFINITION

This definition of morphogenesis can now be used to better understand what morphogenetic art is.

Morphogenetic art is a subfield of generative arts interested in the dynamics of pattern formation as deduced from nature. Generative art has been defined as "any art practice where the artist creates a process, such as a set of natural language rules, a computer program, a machine, or other mechanism, which is then set to motion with some degree of autonomy contributing to or resulting in a complete work of art." [9]

It is distinguished from Alife art that try to simulate or to generate life. The pattern formation mechanisms, once formalized in equations and algorithms, can also be used to simulate organic shapes like in what is called "soft Alife," the study of simulated life. But the artist interested in morphogenesis will be less inclined to imitate the living than to directly present the geometric principle itself. The beauty of an equation lies in its elegance, its simplicity and its universality. It does not capture the beauty of nature but the beauty of the principles that manifest themselves in nature's amazing diversity. Morphogenetic arts don't talk about nature, but about its structure, about the intimate links between nature and geometry.

Designers and architects use the term "digital morphogenesis" to describe the use of shape generation strategies analogous to what can be found in nature. Hensel proposes to bring the analogy between architecture and living systems further, seeing architecture as a living organism, taking into account its growth mechanisms, its behaviours, its adaptability, etc. [10] Artists and scientists of morphogenesis are not only interested in how living systems are organized and how they evolve in their internal structure, but also in their relationship to their environment. Of particular interest for the artist is the way biological metaphors can help consider an artwork in its ecosystem, as a living creature evolving in a particular context, for example social, aesthetic and relational.

For example, looking at the cultural context of generative arts, we can question how we interact with digital artwork. A public immersed in video games, music visualizations and movie special effects can easily confound an artificial life form with some manifestation of popular entertainment. Some interesting generative work blur the boundaries between entertainment and art, virtuality and reality, "life-as-it-could-be" and "life-as-it-is." But some less mature work seems in need to impress, make the public move, manipulate, interact for the sake of interacting. Morphogenesis suggests more organic strategies to involve the public. For example, when it comes to "interaction," one proposition is to think of it as "interrelation."

Personal Experiments

We spent two years developing a series of experiments to refine the concept of interrelation in morphogenetic artworks. The first work of the series presented the non-interactive evolution of a spherical harmonics shape exhibited at the Saussignac castle in Dordogne (http://bit.ly/spherical_harmonics), immediately followed by a second experiment, in an art production residency in Quebec (http://bit.ly/spherical_product), to explore interrelation strategies. A supershape was evolving according to the ambient sound analysis from two different art centers, that collaborated in equal parts to shape the organic form. The result was interactive in the sense that one could see the effect of his or her voice on the evolution of the shape. But, as it was also guided by the ambient sound of the other gallery, the organic

form seemed to have a life of its own. The interrelation between the sound and the shape began to feel more abstract than a mere direct reaction. To dig further in this abstract encoding scheme, we developed "Orbs" (http://bit.ly/expo_orbs) and experimented with minimal interaction. The simple throw of a marble in a bowl triggered the deployment of a complex spherical universe. The reciprocating component of the trajectory of the marble was transformed into two circular shapes assembled by spherical product and embedded in an evolving representation of a spherical universe. The minimal but primordial gesture of throwing the marble could barely be assimilated to interactivity, being more like an impulse for the series of geometric transformations, analogous to a minimal interface to the outside world triggering and guiding the growth of an organic shape. In a third experiment called "Genoma," launched in Italy (http://bit.ly/genoma_mercato) and developed in São Paulo (http://bit.ly/genoma_sao_paulo), the series of geometric transformations was replaced by a complex "genome" encoding. The goal was to explore the possibilities of mapping the ambient sound of the gallery in a way that could not be confused with a direct interaction, but still showing the effect of the sound on the evolution of the shape. The sound analysed acted as a parasite for a rudimentary "genome" made of flocking agents exchanging data as they met. This data mutation influenced the evolution of the shape, involving a luminous Superformula surrounded by a particle system representing the genome flocking in spherical space. The result exhibited very organic behaviours, being autonomous in its development but responding to input from the environment in a very slow and deeply abstract manner.

This abstract interrelation replacing direct interaction is analogous to the kind of communication we can have with natural phenomena. Gesticulating and yelling at a flower will probably not result in a direct reaction. But caring and watering it will surely determine its evolution. Choosing interrelation over interaction has a profound impact on all kind of relations, be they social or cultural, where the effects often reaches deeper levels as the interaction is subtle.

The next exhibition in preparation also explores the abstract encoding between a stimulus and a generated shape. But this time, the focus is on more advanced geometry. It involves supershapes transformed into catenoids, the Superformula being used as the energy minimization function of a Wulff shape equation to form a "Constant Anisotropic Mean Curvature" (CAMC)[12], a type of minimal surface that can be interesting to morphogenesis. The resulting shapes will be printed in 3D by rapid prototyping and displayed with the word that served as the material for its evolution. Families of shapes evolve following families of sound characteristics, not because they are visualization of the sound, but because the sound is the seed, the impulse that triggers its evolution. In all of these projects, the idea was to experiment with abstract organic mapping as an alternative to the arbitrary mapping that is often used in biologically inspired art works. Instead of aggressive interaction, a minimal interface with the environment and a slow interrelation helped to place the participant in the role of a natural agent influencing, but not completely determining, the becoming of an autonomous shape.

Conclusion

The study of morphogenesis includes geometric patterns and mechanisms of growth observed in nature. It is a very broad area of research focused on the discovery of the structure of life itself. The combination of Alife, biology, geometry and art can lead to new ways of thinking about natural forms, about the principles at the roots of matter and life, and about the complex interrelations between each part of the complex ecosystem in which we live.

References and Notes:

1. P. Bourgine and A. Lesne, *Morphogenesis: Origins of Patterns and Shapes* (New York: Springer, 2010).
2. J. Gielis, "A generic Geometric Transformation that Unifies a Wide Range of Natural and Abstract Shapes," in *American Journal of Botany* 90, no. 3 (2003): 333.
3. R. Thom, *Structural Stability and Morphogenesis* (New York: Perseus Books, 1994), 8.
4. D. Thompson, *On Growth and Form* (Cambridge University Press, 1942).
5. S. Leduc, *The Mechanism of Life* (London: Rebman, 1914).
6. A. Turing, "The Chemical Basis of Morphogenesis," in *Philosophical Transactions of the Royal Society of London: Series B, Biological Sciences* 237, no. 641 (1952): 37.
7. C. Langton, *Artificial Life: the Proceedings of an Interdisciplinary Workshop on the Synthesis and Simulation of Living Systems* (Boston, MA: Addison-Wesley, 1989), 2.
8. J. Conway, "The Game of Life," in *Scientific American* 223, no. 4 (1970): 4.
9. P. Galanter, "What is Generative Art? Complexity Theory as a Context for Art Theory" (paper presented at GA2003 - 6th Generative Art Conference, Milan, 2003).
10. M. Koiso and B. Palmer, "Equilibria for Anisotropic Surface Energies and the Gielis Formula," in *Forma* 23, no.1 (2008).

MANY WITH A MOBILE CAMERAPHONE: THE DEMOCRATIZATION OF DOCUMENTARY?

Richard Vickers

The author is developing a new interactive documentary project entitled 24–hours.in (www.24–hours.in), exploring opportunities for participation and collaboration. The project is currently at the proof of concept stage, and is being discussed as a work in progress, exploring the impact of mobile phones and the potential that these devices, the web and social media may offer for the democratization of documentary production.
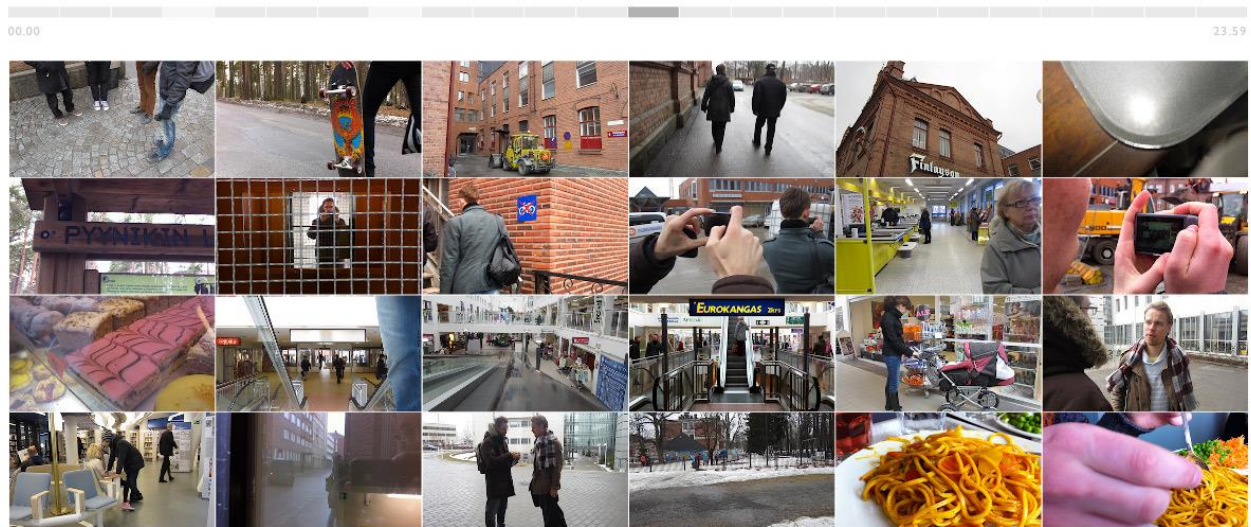
Fig 1. 24–hours.in Tampere main interface, 2011, Richard Vickers & James Field.

Fig 2. 24–hours.in Tampere video content, 2011, Richard Vickers & James Field.

Looking back – defining documentary

Since the invention of photography and consequently cinema, the camera has been used to capture or document reality; actual events that happened at that moment in time, however banal. Nicéphore Niépce, one of the pioneers of photography, pointed his camera out of the window in 1826 to capture what is now the earliest surviving photograph, 'View from the Window at Le Gras.' In 1888 Louis Le Prince captured some brief (2 seconds) but extraordinary footage, 'The Roundhay Garden Scene.' Perhaps the most famous early film, and often mistakenly cited as the first ever motion picture made, is the Lumière brothers 'Workers Leaving the Lumière Factory', 1895.

John Grierson is attributed with coining the term documentary in 1926, when he reviewed Robert Flaherty's film 'Moana.' In 1929 Grierson produced 'Drifters', a silent documentary that tells the story of Britain's herring fishing industry, filming real fishermen out at sea and capturing the reality of the experience. The film contains many of the characteristics that define documentary, particularly the observational style. Drifters was an attempt to create an 'imagist' film in response to the avant-grade 'city symphony' films and to reintroduce socially directed commentary into formalist film (Barson, 2006). Grierson believed that documentary film could change the world, that by increasing social awareness it would contribute to the development of society.

In the same year, Dziga Vertov produced 'Man With a Movie Camera', an outstanding example of avant-garde documentary filmmaking that still resonates today, perhaps even more so than it did at the time. The British Film Institute description of the film says, "Man With a Movie Camera is an extraordinary piece of film-making, a montage of urban Russian life showing the people of the city at work and at play,

and the machines that keep the city going. […] a work that is exhilarating and intellectually brilliant" (BFI, 2000). The film represents 'a day in the life' of the recently established Soviet Union, capturing 'life caught unawares', with the filmmaking process transparent and evident throughout.

Prior to making Man With a Movie camera, Vertov had worked on the 'kino–pravda' newsreel series, a film version of the Pravda newspaper. He believed that the 'kino–eye' or camera 'eye' could not only capture life 'as is', but reveal a deeper level of truth than was normally perceived by the imperfect human eye (Cousins & Macdonald, 2006). With the kino-eye movement Vertov explored a participatory model aiming to move away from the authorship of a single person to mass authorship and a montage vision. Vertov's aspirations for the movement encompassed the democratization not just of technology but also of creativity (Hicks, 2007). Man With a Movie Camera is often cited as the first example of data-base cinema, long before the database as we understand it today existed. Lev Manovich states that; "Man With a Movie Camera is perhaps the most important example of a database imagination in mod-ern media art" (Manovich, 2001). Drawing a comparison between Vertov's film and the contemporary experience of the web, Seth Feldman suggests:

…the prototype of the net surfer downloading the bits and pieces of fragmented information. Vertov the filmmaker and advocate of mass filmmaking could well be thought of as a pioneer in the building of a system in which millions of people reconstruct fragments. (Feldman, 1999)

1960 was a paradigm-shifting year for documentary, the French anthropologist and filmmaker Jean Rouch, and sociologist Edgar Morin, had access to a prototype Éclair camera that was both highly portable and quiet. They utilized this new technology in the production of the experimental documen-tary film, 'Chronique d'un été', exploring the lives of ordinary Parisians, 'the strange tribe that lives in Paris', over the summer of 1960. This was the birth of 'cinéma vérité', Brian Winston identifies Chronique d'un été as the key film of the movement, saying:

They tried in some way to guarantee the 'truth' of their own observation because we, the audience, could observe them apparently in the act of observing. (Winston, 2008)

Cinéma vérité had direct lineage to Vertov, the name being a French translation of 'kino-pravda' or cin-ema-truth. The film that defined the beginning of the movement, Chronique d'un été, can be described as 'life caught unawares' and Jean Rouch said that the film was a homage to Vertov (Roberts, 2001). The new portable cameras gave the filmmakers unprecedented freedom of movement that allowed them to shoot real life and capture reality as never before possible. Intimate and immediate, it was like actually being there, documentary would never be the same again.

Being participatory

The internet, or more specifically the web, has changed the media landscape exponentially over the last decade. The online video sharing platform YouTube, launched in 2005, has fundamentally changed the consumption of media in the 21st century. YouTube established a media environment that not only en-abled users to share videos; it also offered an opportunity, in their own words, to "Broadcast Yourself" to a worldwide audience. It is a phenomenal success, the web information company Alexa Internet (www.alexa.com) currently ranks YouTube as the 3rd most visited website in the world, with social net-work Facebook in 2nd place and search engine Google (who also own YouTube) in 1st place. But the platform for self-expression is not without its critics, Alexandra Juhasz comments:

YouTube allows everyone and anyone (with access to the technologies) to speak about everything and anything they please. I speak, you watch. But without context or community, who cares, and more critically, then what?(Juhasz, 2008)

Interactive documentary is a rapidly evolving field, with participatory projects embracing the opportunities that the internet and social media platforms offer. YouTube's 'Life in a Day' project (http://www.youtube.com/user/lifeinaday) was developed to document a single day, the 24th July 2010, on planet earth. Contributors from around the world were encouraged to capture a glimpse of their life on that day and then upload their video to YouTube for consideration to be included in the final film. YouTube received over 80,000 video clips and some 4,500 hours of footage. Sifting though all the footage and dealing with the multitude of formats, resolutions etc. was a formidable undertaking. The final 95–minute film directed by Kevin Macdonald and produced by Ridley Scott, went on general cinema release earlier this year.

'Man with a Movie: Camera the Global Remake', (http://dziga.perrybard.net/) is an online participatory video project that launched in 2007. Participants around the world were invited to record images interpreting the original script of Vertov's Man With A Movie Camera and then upload them to the website. Software developed specifically for the project archives sequences and streams the submissions as a film. Anyone could contribute footage to become part of a worldwide montage, in Vertov's terms the "decoding of life as it is." Sandra Gaudenzi suggests that:

The participative options of digital media enhance our acting role and therefore allow us to mediate reality in a shape that is more attuned with our way of being in the world. (Gaudenzi, 2011)

Online and social media platforms offer a means for participation, collaboration and distribution or dissemination that was unimaginable even a decade ago. The ubiquitous mobile phone offers the means of production. The first cameraphones were developed in 1997, however resolution and image quality remained fairly low until recently. Improvements in imaging sensors has resulted in a new breed of cameraphone that can record HD (High Definition) Video at 1280 x 780 resolution. Video captured on these devices is impressively good considering the small size of the lens. The mobile phone has become part of the social fabric of 21st century life, nearly everyone will have one with them at all times in a pocket or bag.

The author and Lincoln School of Media colleague James Field are developing a new interactive documentary project entitled 24–hours.in (www.24–hours.in), exploring new opportunities for participation, collaboration and the potential democratization of documentary production. Utilizing user-generated video captured on mobile phones and available devices, the project is participatory whereby the audience contribute documentary videos, around the theme of 24 hours in a city or location; for example 24–hours.in Istanbul or 24–hours.in Tampere.

With reference to Dziga Vertov's 'Man with a Movie Camera' and the concept of capturing life 'as is', the aim is for the user-generated videos to document the cities, the people that live there and their daily lives. Building on Vertovian concepts, the project explores the potential that the ubiquitous cameraphone 'eye' may offer for a unique and cumulative vision of truth to emerge. Moving beyond the participation model, the project will build up a database of location specific documentary material and aim to create a new system for collaborative documentary production and user-curated content.

24–HOURS.IN TAMPERE – AN INTERACTIVE DOCUMENTARY

In April 2011, the author attended the Tampere Art Factory International Week, hosted by TAMK School of Arts & Media, Tampere University of Applied Sciences, Tampere, Finland. During the international week he ran an interactive documentary workshop, working with students from TAMK to produce a pro-totype 'proof of concept', a collaborative, participatory, experimental documentary project centered on 24–hours in Tampere. The aim was to document the city of Tampere, with reference to (but not recreat-ing) Vertov's 'Man with a Movie Camera'. The workshop participants were encouraged to embrace Ver-tov's pioneering avant-garde approach to filmmaking, using cameraphones to capture 'life caught un-awares.'

The workshop began with a briefing on the technologies that would be utilized, a discussion on good practice and principles of using mobile devices for filming, screenings of interactive documentaries and Vertovs Man With a Movie Camera. Interestingly the students were aware of the film but hadn't actually seen it, they found the film striking and it is testament to the outstanding qualities of the film that it still resonates today. An important consideration was file size and bandwidth, video = data, 1 second of iPhone HD (1280x720) video = 1.3MB, so there was a requirement to keep the video clips relatively short. The participants were therefore encouraged to keep individual shots or scenes short, with the proviso that they could add lots to the database, one shot per minute over 24 hours would equate to 1440 shots. Adobe Flash Media Encoder was used to compress and encode the videos for online delivery in the FLV/F4V format.

For the prototype developed in Tampere the process of encoding and adding to the online database was laborious and time consuming. Using Adobe Media Encoder, each individual video clip was encoded and optimized for delivery over the internet, also for each clip a JPG image file was created for display in the main interface. All clips were uploaded via FTP to the project directory and a database entry made de-tailing the author of the video and importantly the time using the 24–hour clock. The process is best summarized with the mantra: Edit > Encode > Upload > Add to Database, seemingly ad infinitum.

The project is available online at http://www.24–hours.in, using Adobe Flash as the delivery platform. The main interface is a grid of 24 images, each one representing an individual video clip for that time within the 24–hour clock. Visible above the grid of still images (Figure 1) is a line of 24 blocks each giving the user a shortcut navigation to the 24 individual hours in the 24–hour period. Clicking on one of the images plays the linked video clip, there is a simple transition between the grid display and the video playing, the author of the video and the time are displayed in the lower left hand corner below the video clip. Clicking on the video as it plays will close that clip and return to the main interface, the still image from the video that was playing forms the first image of the 24 displayed. If the user does not close the video, the next clip chronologically plays and will continue playing through all the clips.

Once a video is selected and plays, the timeline visible above the video alters from the 24 block system to a more representational timeline (Figure 2), indicating where video content is available during the timeframe. Bunching of content is apparent at key times. The user can use the timeline to navigate be-tween clips and time in a non-linear fashion.

Capturing scenes of life as the city awoke from the long Finnish winter; the cleaning of the streets, the simple pleasure of going for lunch, the political elections: 24–hours in Tampere offers a fascinating insight into everyday life in the city. One of the contributors to 24–hours.in Tampere commented: "After the first few shooting hours it became like an addiction. You begin to see everything not with your eyes, but with the video camera lens. Every minute scanning through buildings, people, events to find some perfect shots that could be interesting for the person sitting at the other side of the screen somewhere far away..."

The project is in further development to automate the process of encoding the video clips and currently focused on the implementation of FFmpeg on the server to convert and encode video on the fly. HTML 5 video will be utilized to offer a full cross-platform experience without the need for plugins. Other features that are being explored are key word searching and sorting for the clips and attempts to exploit geolocation data. It is intended that the project will roll out on an international basis later this year, adding 24-hours.in locations to offer a fascinating insight into 21st century life around the world.

Conclusion

During the past year we have seen mobile phones, the internet and social media platforms contribute to revolutions for social and political change in the Arab world, known as the 'Arab Spring.' Mobile phones were used to capture events as they happened and the power of the internet and social networks harnessed to circumvent the traditional media platforms that were controlled and censored by the state. The collective use of technology empowered the people to progress an agenda for democratic reform, in some instances accomplishing complete regime change that many had only dreamt of years.

Armed with our ubiquitous mobile devices and cameraphones we all have the potential to document everyday reality and ordinary life as we wander the city. We can capture the nuances of the vernacular, regardless of how banal or seemingly unimportant they may seem at the time, for posterity and digital eternity. Used collaboratively to capture unique moments, cameraphones can give us a window on the world, and as time goes by, a window on the past. Pervasive mobile phones and smart devices offer an unprecedented opportunity for the democratization of documentary production. These devices are in the hands of the many, with the potential for a collaborative and cumulative vision of truth about humanity and life in the 21st century to emerge.

References and Notes:

Alexa Internet, Alexa Top 500 Global Sites, http://www.alexa.com/topsites (Accessed August, 2011).

Tanya Barson, Making History: Art & Documentary in Britain from 1929 to Now (Tate Publishing: London, 2006), 11.

Mark Cousins & Kevin Macdonald, Imagining Reality (London: Faber & Faber, 2006).

Seth Feldman, "Peace, between Man and Machine: Dziga Vertov's The Man with the Movie Camera", in eds. B. Grant and J. Slioniowski, Documenting the Documentary (Detroit: Wayne State University Press, 1999).

Sandra Gaudenzi, Interactive Documentary Blog http://www.interactivedocumentary.net/ (Accessed March, 2011).

Jeremy Hicks, Dziga Vertov: Defining Documentary Film (London: I.B. Tauris, 2007), 17–18.

Alexandra Juhasz, "Documentary on YouTube," in Rethinking Documentary New Perspectives, New Practices, eds. Thomas Austin and Wilma de Jong (Open University Press: London, 2008), 304.

Man With a Movie Camera, DVD, (London: British Film Institute, 2000).

Lev Manovich, The Language of New Media (Massachusetts: MIT, 2001), 239.

Graham Roberts, The Man With The Movie Camera (London: I.B. Tauris, 2001), 91, 100.

Brian Winston, Claiming The Real, (London: BFI/Palgrave Macmillan, 2008), 166.

SELF-TRACKERS: WHY DO THEY PREFER THE SPREADSHEET TO THE SOFA?

Stephanie Vidal

With their smartphone, self-trackers log daily chosen parameters. Being the experiment and the experimenter of their own laboratory, they live a « data-driven » life. Based on numbers, self-tracking is seen as an alternative to psychoanalysis for reaching the self. Trackers mistrust words which they find too limited and prefer to rely on spreadsheet than to lay on sofa.
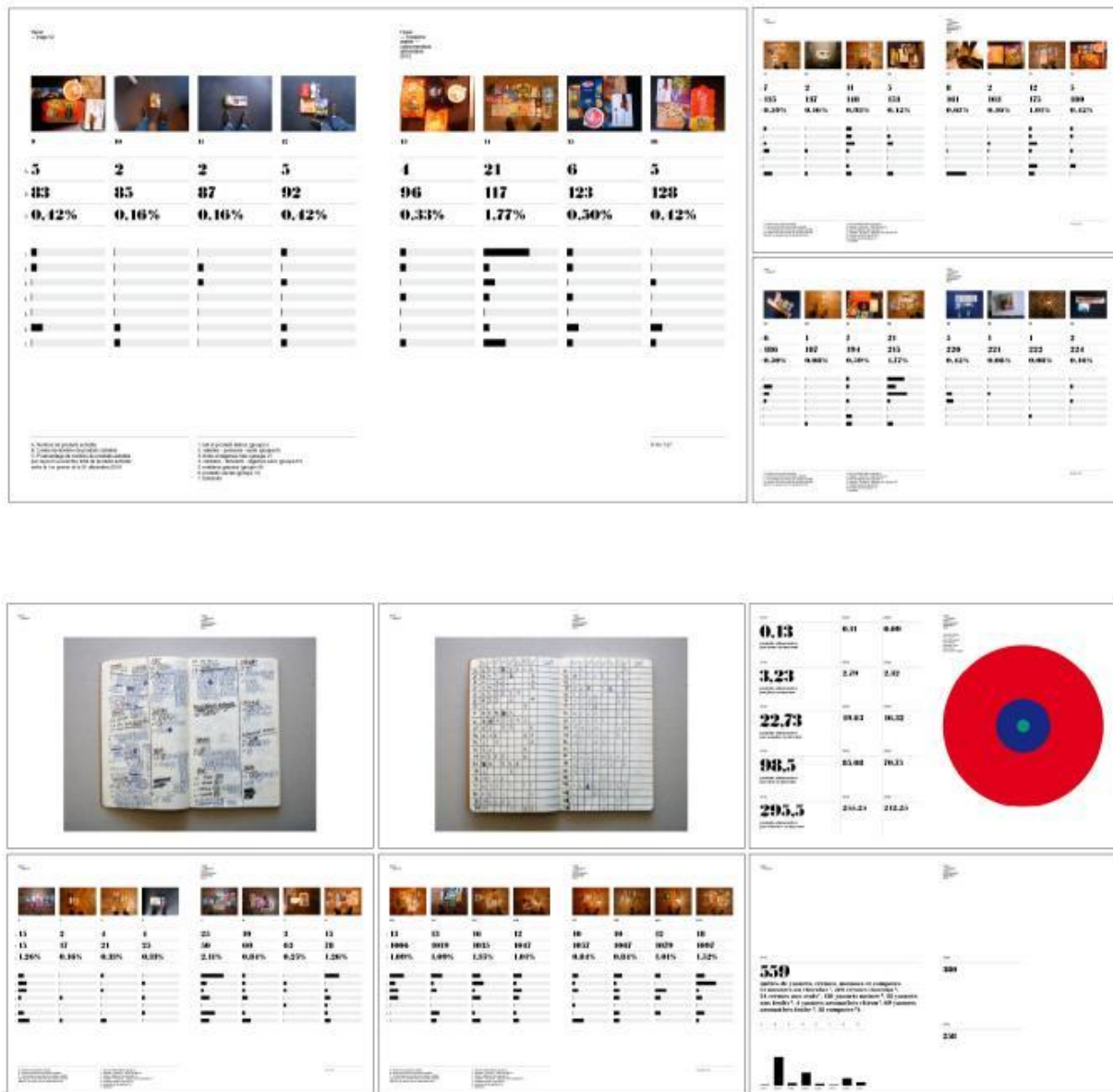
Hyper, 2010, Florent Guerlain.

A world in Numbers

"Personal Note. 11:15, restate my assumptions: 1. Mathematics is the language of nature. 2. Everything around us can be represented and understood through numbers. 3. If you graph these numbers, patterns emerge. Therefore: There are patterns everywhere in nature." says Maximilan Cohen, number theorist and main character of π, a Darren Aronofsky's movie released in 1998.

From Pythagoras to Descartes, from Kant to Poincaré, philosophy comes with the paradigm that our world is run by invisible numbers and mathematical equations. Nowadays this assumption is deeply established in the mainstream culture and embodied in scientific, business and even artistic projects. Artists choose data as raw material, traders use algorithms, some physicists visualize imperceptible particles while others—among them bestselling author, Brian Greene—seek after a unique and elegant equation to explain the entire universe.

Numbers and data streams are everywhere and can be easily collected, analyzed and visualized. Computational technologies we use everyday and everywhere from labs to personal desktops—even the smartphones in our pockets—were originally built to compute. Self-trackers are people who use those technologies to count and quantify themselves. They want to acquire a better understanding of themself through self-experimentation in an innovative way that decreases human sources of vagueness. Their common assumption is if nature can be understood in a mathematical way, why can't human beings as well?

As a new practice at the crossroads of technology, digital humanities and art, self-tracking aims to better understand behaviors by finding hidden patterns in daily routine. Self-trackers believe in the truth of numbers more than in the power of storytelling. That is why they use self-tracking as a way to reach the self, an alternative method they consider even better than psychoanalysis. Moreover, some of them use self-tracking in a political gesture, wishing to empower with numbers.

This article aims to present this practice and to show how new contemporary behaviors, that bet on mathematical language and on digital equipments, redefine or redesign established concepts. Self-trackers can be seen as an extreme example of the presence of data in human life. The premises and methods of self-tracking challenge the notions on humanity and society as well as the ways to study humanity in the attention and information age.

The Geek Diary

Self-trackers are people who gather, analyze and share their own data. They log chosen parameters—reporting on work, sports or sexual achievements, measuring and monitoring mood, food, health or finances—to develop a personal project.

Each tracker works out his proper methods. Even if they know what they are seeking at the start of theirs adventures, they are generally surprised what they find. Some are artists, others scientists, but most of the time they are just curious.

Self-tracking is already a massive trend, growing daily. Community sizes vary from hundreds (Me-trics) to thousands (YFD, Daytum) to billions (Runkeeper) of members depending on the parameters they focus on and the tools they use to monitor themselves. Tools and applications are fundamental; they allow personal logs and create the communities.

Self-tracking is conceived as a geek version of a diary where words are replaced by numbers and paper by digital spreadsheets. Self-tracking starts with a life-logging to begin gathering their data. Leading a kind of anthropological study of which they are the subject; they are looking for self-knowledge and personal insights through imponderability.

Used for the first time by Bronislaw Malinowski, imponderability is defined in his book Argonauts of the Western Pacific as "a series of phenomena of great importance which cannot possibly be recorded by questioning or computing documents, but have to be observed in their full actuality (…) such things as the routine of a man's working day, the details of his care of the body, of the manner of taking food and preparing it...." That imponderability are precisely what trackers are looking for and recording thanks to personal devices that did not exist yet in 1984.

Memory Tools

My Life bits, the Gordon Bell's project can be seen as an extreme example of life-logging. It aspires to be an exhaustive recording of his life thanks to several devices that save everything about him. He wears a microphone that keeps all his conversations and a special camera that takes pictures each time there is a change of light in his environment. And all of his physical and digital activities are saved, as are his movements and his web navigations.

The logging process is fundamental for self-tracking; it is the first step to create the appropriate development of the procedure. Trackers note what could be seen as humdrum and insignificant moments, keeping them in external storages. Machines, in opposition to human beings, are not subject to memory distortion or oblivion.

Even if self-tracking is based on life-logging, the example of Gordon Bell gives rise to the differences between these two practices: self-trackers only track the parameters they have chosen, finding them relevant for their personal research. Life-logging and self-tracking diverge in their final goals: the first only cares about saving traces and the second wants to make sense of them. By both leaning and relying on technological devices, they give their equipment the status of memory tools.

If some cases of self-tracking has have been noticed before, the trivialization and ubiquity of technological devices makes the process now easier. Trackers still crave for more automation of the gathering process and crave for digital devices called sensors to elude the manual log. They would save and send the information directly to the analysis softwares. They would seek to make the logging phase less time-consuming and to decrease the rate of human errors in the process.

Transforming daily routine into quantifiable facts the trackers paraphernalia is made of personal devices

that are used as scientific instruments. Iphones and Androids, always in the pocket of a self-tracker, enable precision and repetition of experiments that suits this continuous and rigorous process. Smartphones are at the core of self-tracking. Thanks to them, trackers upload and share their data anytime, anywhere, using specialized social platforms. Those platforms such as YourFlowingData or Daytum generate the graphical representation of the collected data that lead to their analysis.

Daytum was created by the designer Nicholas Felton, also called Feltron, famous for its Annual Report. Edited each year, using various concepts, patterns and datasets, the Feltron's Annual Report is a graphic and statistic review of the artist past twelve months.

He started to self-track to produce innovative designs using his own data as free and endless raw material. The young designer, Florent Guerlain, works in the same way making artwork out of his everyday food consumption. The project called Hyper, started 3 years ago, is still running today (Fig 1 and Fig 2).

The Life Lab

For both designers, self-knowledge through numbers was not the initial goal of their data practice. However they have come to learn funny things about themselves and would not stop collecting data. Data become a material for personal investigation, artistic creation and self-knowledge production.

Trackers tend to grasp their imponderability and to weight it, studying data streams they have composed. Translating their tastes and behaviors in lists of numbers, they develop a rational process to reach the hidden order that secretly drives their self.

"For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask," says Gary Wolf, editor of the magazine Wired and co-founder with Kevin Kelly of the website Quantified Self. Being the experiment and the experimenter of their own laboratory, self-trackers' life is a daily "data-driven" exploration.

Extracting meaning out of data, sharing and confronting results, a self-trackers' first will is "self-knowledge through numbers," which is also the motto of Quantified Self. They implement a scientific method to curiosity. Self-exploration intends to make sense out of daily routines and transforms non-factual things into meaningful insights. Self-trackers often confront several parameters—like their coffee consumption and their work productivity—to observe if parameters they feel correlate are truly linked. Often numbers disabuse their intuitions.

Spreadsheet versus sofa

Numbers versus intuitions, statistics versus memorabilia, spreadsheet versus sofa: self-tracking is all about that! Self-trackers consider that numbers fit better than words to access the personality core and to reveal patterns hidden between habits. That is why they prefer the spreadsheet to the sofa.

The mathematical language was once based on the verbal one. Then it became more and more complex

and needed to develop its own and separate form. Its history is—to use critic Georges Steiner's words— *the history of a progressive* untranslatability. Since the separation of verbal and numerical language, experience and reality perception have been separated in two aesthetic vision. In *The retreat from the word* Steiner explains that some phenomenons like time-space continuum or relativity theory have been conceptualized *outside* verbal language. Expressed through words they look like "animated fictions". Does the world can be better understood with numbers than with words ? Do they express and reveal the true nature of the universe as world never would? Trackers do not work with difficult equation to explain the world mysteries, they tend to understand their own complexity with simple numbers. They do not spend their life in a scientific laboratory, they are the laboratory. The trackers proclaim and mainstreamize the mathematical language triumph over the word one with their practice.

As they use machines to compensate for what human memory lacks, they too find in numbers the solution to words' failures. Indeed, with self-tracking all spoken language is globally criticized as an obsolete and incompetent system for efficient self-investigation. As psychoanalysis is based on verb, memory and storytelling, we can understand the self-trackers reluctance to subscribe to it.

Trackers upbraid verbal language for several reasons: its linearity and length, its lack of objectivity and expressiveness, its propensity for misunderstanding, its possibility of lying and the impossibility to communicate to whom who do not know this particular code—like people who do not understand a particular language or even animals or plants that are not equipped with sensors.

Seen as biased and incomplete, verbal method is avoided during the gathering and analyzing process. Even if trackers agree that psychoanalysis might help to find troubles that influence mood, they believe that it does not offer solutions as data analysis can. Trackers want to be able to modify their comportments in order to experiment with it directly.

Moreover, they think that people can lie or feel uncomfortable lying on a sofa, talking to a psychoanalyst. Arguing that it is also possible to lie to a machine, trackers answer that there is no personal interest to do so. Machine's main strength is they do not lie or please. Charts guarantee to obtain objective and trustful results.

In this system, the disappearance of human interactions during the process seems to grant a better knowledge of human behavior. But human interactions are not totally eclipsed. They come later when trackers present their methods and results to their community during meetings or let them accessible on social platforms.

Form Collective Intelligence to Collected Consciousness?

Even if the goal of self-tracking is not to figure out mankind in general, it is about finding personal comfort in everyday situations; trackers sometimes contribute to collective events, sharing their data and method to go further.

Sometimes they get along and collaborate on wider projects—most of them are dealing with medical care or emotions tracking—putting their results into a common conversation. On websites like curetogether.com, founded by Alexandra Carmichael, sick people can track their vital parameters and

join together to study their illness. She gives an example of patients affected by amyotrophic lateralsclerosis (ALS) who decided to observe the effect of lithium on their health state. Even if the results were not conclusive, a study seldom involves so many patients for so little time and money.

If data can be used for good, we are yet to discover the potential of these personal datasets. This information can have different use once available on a network. It brings up questions: who has access to personal data, why and what for but also what is considered now as personal data? Indeed, the notion of personal data seems to overtake its juridical definition.

Personal data is not limited to that which allows the identification of human beings, but extends to things that contribute, once viewed together, to build or reveal identity. In this understanding, personal data is not only what people produce or interact with, but also what they decided to gather as an extension of their self. Personal data is then contextual, earning its status by the individual and through the voluntary process of saving. This is perhaps why a data set on coffee consumption or a list of books can reach the status of personal data.

No one likes to lose the content of their hard-drives containing music, pictures, and texts and such. In this way the Collectif 1.0.3 uses the content of personal hard drives to shape digital portraits and Michele Gauler keeps memories of dead people compiling their data in storages that are, at the same time, the material proof of their legacy and everlasting presence.

As we absorb external content to transform it into personal data, we also leave traces of our path everywhere we go in the digital world. Sometimes, like trackers, we digitalize them on purpose, and sometimes we even forget that we do so. In their bachelors thesis called ~IDENTITÄT – The »Gestalt« of digital identity, Jonas Loh & Steffen Fiedler have created sculptures that represent the digital identities of people based on their activities on cultural and communicational websites. Here is a relevant insight into 21st Century society: there are no longer innocent surfaces today.

Information can now be considered as a value and so is attention. In our digitalized society, time is precious and information is massively available and recordable. Our behavior seems to mimic managerial and scientific methods: find what is profitable and, thanks to software, extrude meaningful results out of it. The culturonomics, the study of culture through the amount of digitalized books, can be seen as an other example of this trend. Books are not read anymore, but the words they contain are transformed into data to shape a diagrammatic portrait of our culture. Perhaps the social paradigm shifts following this move. From words to numbers, from information to attention; people seem to progressively abandon privacy for self-attention, sofa for spreadsheet, imponderability and memorabilia for digitalized and quantified facts.

References and Notes:

Bronislaw Malinowski, Argonauts of the western Pacific : an account of native enterprise and adventure in the archipelagoes of Melanesian New Guinea (Prospect Heights Ill.: Waveland Press, 1984).

George Steiner, Language and silence : essays on language, literature, and the inhuman, Yale University Press, 1998.

Jim Gemmell, Gordon Bell, and Roger Lueder, "MyLifeBits: a personal database for everything", in Communications of the ACM (CACM), vol. 49, no. 1, (January 2006) pp. 88-95, Association for Computing Machinery, Inc.

Roberts, S. Self-experimentation as a source of new ideas: Exemple about sleep, mood, health and weight. Behavioural and Brain Sciences, (2004) 27, pp. 227-262.

Gary Wolf, The Data-driven Life, The New York Times. Website Publication: Avril, 28 2010. http://www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html
Print Publication : May 2, 2010, page MM38, Sunday Magazine.

Alexandra Carmichael, Self-Tracking: The Quandtified Life is Worth Living, H+Magazine. Website publication: February 8, 2010.
http://hplusmagazine.com/2010/02/08/self-tracking-quantified-life-worth-living

Matthew Fuller's official website, Freaks of numbers, March 2004. http://www.spc.org/fuller/texts/freaks-of-number

CAPTURING DANCE AND CHOREOTOPOGRAPHY: ANALYZING AND VISUALIZING COMPLEXITY

Kim Vincs

Motion capture provides 'snapshots' of the complexity of movement patterning. This presentation explores both the power and limitations of quantitative motion capture analysis, drawing on *Capturing Dance*, a three-year collaboration with mathematician Vicky Mak-Hau and biomechanist Richard Smith at the Deakin Motion.Lab in Melbourne, Australia, and on the live motion capture / 3D performance *Choreotopography*.
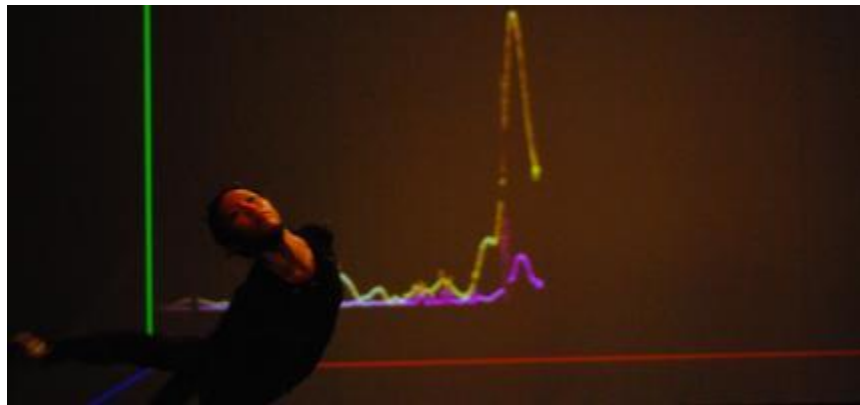
Fig 1. Velocity Engine / IK Dancer, Deakin Motion.Lab, 2011. Performer: May Yen Cheah, Interface: Peter Divers and John McCormick, Image: Kim Vincs.

Fig 2. Choreotopography, Deakin Motion.Lab, 2010. Performer: Sakura Shimizu, Choreography: Kim Vincs, Motion Graphics: Daniel Skovli.

The allure of motion capture for dance is that it can record the three-dimensional trajectory of movement in precise detail. However, dance is conceptual as much as it is physical, and dance movement only becomes meaningful via the artistically and culturally specific frames of reference that underpin its construction and interpretation. In this paper, I want to explore how motion capture analysis can potentially illuminate and drive creative processes in dance. However, understanding what is artistically meaningful

in motion capture data depends on an examination of the ontology of dance movement itself, and how that ontology both intersects and conflicts with quantitative analysis. In the *Capturing Dance* project, a three-year collaboration with mathematician Vicky Mak-Hau and biomechanist Richard Smith at the Deakin Motion.Lab in Melbourne, Australia supported by the Australian Research Council Discovery program (DP0987101), a team of artists and scientists came together to explore quantitative analysis of dance style using motion capture. This paper discusses the approaches the project has explored to date, as well as the studio-based and performance processes that have emerged as a response to the reductionism inherent in quantitative motion capture analysis.

I find motion capture data compelling because when I watch a marker cloud cross a screen, I see the traces of movement trajectories that are otherwise only accessible to me as abstractions – as what I thought I did and/or what I would have liked to have done. The possibility of accessing my movement, or another dancer's movement, in a way that doesn't immediately disappear, but can be replayed and watched over again, from any angle in a 3D volume, allows me the possibility of savouring a movement pathway in a way that is not possible when watching or performing a movement in real time.

Motion capture gives me a spatial and temporal perceptive mode in which to experience movement that is quite unlike the flat plane that comes back to me from video or mirror, but also qualitatively different from watching dance movement in 'real' time and space. The power of motion capture data is to visualize lines of movement from multiple, moving vantage points within a three dimensional volume. The ability of the virtual 3D in-computer world to let me spin the volume around, as if myself flying and swooping through space to better view and understand the movement I am watching, has the effect of allowing me access to the vantage point of a co-dancer. I can perceive the movement while 'moving' myself, as if I were dancing with the image, but this 'movement' allows me a spatiality that is free from gravity and physics, so that I can move in much faster and more extreme ways through the volume with my mouse and eyes than I could possibly hope to do in the flesh.

I am tempted to think that perhaps the dream of contemporary dance to de-hierachize the body, in its conventional standing, gesturing, speaking subjectivity, is stretched to its extreme limit in the potentially stomach-churning flying and falling pathways I can take as a viewer of motion capture data navigating a virtual volume.   Laurence Louppe has argued that one of the key projects of contemporary dance has been a process by which the zones of the body associated with the semic and with power were "…caught up in a great reversal, a great work to de-hierarchize the role of the limbs: beginning with the head – at least as the support for the face which was no longer to be the imperial and immovable throne of expression, meaning or utterance." [1] Motion capture data, in its raw form of marker trajectory in *x, y, z* space, takes this deconstruction to its limit. Marker data may be named (e.g. top head, right wrist, etc.), but its movement is not yet defined by the hierarchy of the skeleton. In the visual apprehension of marker data moving, marker names are only significant in that they indicate a functioning software template. It is marker movement and the creative interpretation of the negative space between them that affords meaning, rather than anatomically determined relationships between markers.

The eye, in the sense of its dominating scopic perspective, has no privilege in a motion capture-enabled environment. The eye's habitual ways of conceptualizing bodies are displaced by motion capture, which is not so much more accurate, as differently accurate, organized via designated points (markers) and trajectories, rather than by lines and surfaces. Marker data, as well as being de-hierarchized, is semantically blind. A raw marker trajectory does not 'know' that it is part of a system. It is simply a record of where a particular point on the surface of the body travelled, and at what speed. No specific marker is more important than any other. The fact that the significance of marker data trajectories is not predicated on

their place within a skeletal organization of the body allows me to think differently about what those trajectories could be. The fact that naming, in this geospatial discourse, is relegated to an instrumental task, appeals to me as a reversal of the more usual epistemological situation in which naming reduces action to an instrumental rather than an investigative role.

The semantic blindness of motion capture data enables quantitative analyses that are independent of the artistic and cultural contexts of dance movements. Mathematical analysis of motion capture data effectively deterritorializes dance, to use Deleuzian terms, [2] because it looks for what is statistically significant rather than what is culturally significant. In our project, we began by applying Principal Component Analysis, a common statistical tool that compresses large data sets into fewer dimensions based on the strongest correlations between parameters, to see whether we could quantify the stylistic relationships embedded in motion capture data of contemporary dance movement phrases. The complexity of the principal components we identified was a revelation in terms of the disjuncture between what we might perceive as artists as key to the movement, and what is statistically significant in terms of the strength of the correlations in the data. Minute, complex interactions between relatively small and seemingly unrelated body segments, such as right mid-foot and centre-head, left thumb-base and right elbow, for example, characterized the analysis, and defied any attempt to derive information that could easily be used by artists in the studio.

A further revelation was the complexity of the movement analysis itself. In biomechanical applications such as gait analysis, most of the variability in the sample is usually accounted for by a relatively small number of principal components, typically $1 - 3$, which can then be used as surrogate for the whole. In our analysis, around 30 principal components were needed to account for 98% of the variation in the movement data, making any easy interpretation of such analysis out of the question. Vicky Mak-Hau's comparison of multiple classification methods, [3] which so far includes PCA, KNN nearest neighbor, Linear Discrimination Analysis, and Hyperplane, Hyperspheric and Hypersphere SVM methods, has produced recognition rates for specific movement phrases of over 99%. These results represent a major achievement in complex movement recognition, and have key applications in data retrieval, verification of movement style, and documentation. However, the mathematical basis of even basic PCA analysis, let alone the more complex data mining techniques needed to achieve reliable recognition rates, is too abstract to provide an intuitive tool that can be used by artists working in a studio.

This discovery led us to trial a number of more studio-based approaches, alongside the mathematical analyses. Firstly, we looked at marker cloud comparison as a rehearsal tool. Allowing a group of dancers to view their motion capture data projected within the studio in real time enabled us to develop a process whereby dancers and choreographer could work together to identify variations in style. The dancers and choreographer worked on a short piece of movement that needed to be performed in unison, yet was difficult to synchronize because it relied on small, idiosyncratic torso and arm movements. We found that being able to focus on specific markers helped to identify where and how the nuanced variations were produced. However, we were also able to view the whole marker cloud moving at once, so that information from the whole body's movement remained embedded in the representation. Because the data was visualized as raw marker movement, we were able to work directly with the trajectories and dynamics of the movement pathways without translating these into words or images. Of course there was talking, and a certain amount of 'naming'. However, the primary discourse was accomplished in terms of the three-dimensional trajectories themselves – a spatio-temporal rather than a linguistic discourse.

After the fact, we were able to apply different marker analyses to look at what had shifted in different dancers' performances. These 'after analyses' functioned in the same way as reductionist scientific methodologies in identifying specific movement variables of interest – in this case, the patterning of mid-back, hip and shoulder movement. However, a key advantage for the creative process was that we were able to do this retrospectively, and therefore without narrowing the exploratory and emergent nature of the dancers' processes in the studio.

Following the idea of marker trajectory as a primary mode of conceptualising movement, we developed another technique we called the 'IK dancer'. In 3D animation, an inverse kinematic (IK) effector moves a point on a character's skeleton, and the software solve engine determines a combination of joint actions to achieve the end position. We began to think of dancing as a living solve engine process that could be led by any marker functioning as an effector. We built a real-time program, created in the Unity game engine by John McCormick and Peter Divers, to visualize different markers and dynamic properties in real-time, such as top head velocity and acceleration. We used the real-time feedback from our 'velocity engine' to experiment with different movement aims, e.g. maximize top head acceleration in a jump. This process opened up for us a world of possibilities in movement exploration because it gave us access to marker data in a visualized space that we could record and examine in three dimensions, and in terms of movement *dynamic*, i.e. velocity and acceleration. While verbal language can specify positional instructions such as 'take your right hand and move it directly upwards until it reaches shoulder height and then circle it outwards through 90 degrees,' it cannot specify movement dynamics – velocity and acceleration – with the same precision. For example, an instruction to accelerate your hand 'quickly up and then slowly across' is indeterminate in quantity and direction. An instruction like this only aquires precision through physical demonstration. Our velocity engine gave us representational access to the dynamics of body trajectories in three dimensional space, enabling us to record, experiment with and manipulate the dynamic information contained in the marker kinematics.

A key aspect of both of these in-studio processes is that, because they focused on marker trajectories, the information the dancers worked with was not dependent on the hierarchy of the skeleton. This is not to say, of course, that the dancers moved without the physical support of their actual skeletons, but rather to emphasie that movement need not be conceptualized in skeletal terms. In this sense, our processes are aligned with Louppe's 'dehierachizing' agenda of contemporary dance, [4] and more broadly, with a Deleuzian deterritorialization of the body that opens new possibilities for movement exploration. [5] Deterritorialization is, in a sense, the opposite of (or perhaps, in a Deleuzian framework, outside to) quantitative analysis in scientific contexts. Analysis has as its goal the identification of key parameters and structural features of datasets that are repeatable, definitive and predictive. The goal of deterritorialization, on the other hand, is to create the possibility of new and constantly evolving ways of connecting information, which is more consistent with the aims of artistic processes.

We took a further deterritorializing step by visualizing our motion capture data in performance using 3D stereoprojection. In *Choreotopography,* [6] we streamed motion capture data from four dancers into three dimensional motion graphics environments created in the Unity game engine, which were projected around the dancers in stereo and viewed by the audience through 3D glasses. We wanted to remove the data not only from its hierarchical/skeletal context, but also from its direct relationship to the dancer's physical bodies. Ruth Gibson, who creates motion capture and game-based environments, articulates the desire to "…translate live-ness into the virtual world, that is individual qualities, authenticity of capture, weight and gravity." [7] We wanted to deterritorialize live-ness by extending it beyond the confines of the dancers' bodies. We wanted to create an illusion of virtual force, as Suzanne Langer

[8] described it, through visualizing dancers' weight, trajectory and force via the kinematics of marker data, and distribute this illusion throughout a performance space.

Creating this visualization using 3D projection allowed the kinematics to escape the two-dimensional plane of a projection screen and access the 'z axis' – towards and away. We used a variety of approaches to visualize 'lines of force' in the motion capture data, including a 'flocking' protocol in which virtual stars followed the dancers' positions in space, an undulating mosaic pattern that was disturbed by the dancers' spatial incursions, and flying cloth simulations that followed dancers' wrist movement. We also created non-interactive environments in which the trajectories of the dancers' movements were framed and complemented by moving 3D 'architecture' such as a series of huge 'blocks' that moved inexorably forward over the performers, and a moving 'infinity field' of particles streaming away from the dancers towards a vanishing point beyond the screen plane.

In addressing what is, or could be artistically and culturally meaningful for dance in motion capture data, *Choreotopography* took an extreme deterritorializing path, extracting the kinematics of dance movement from the hierarchical semantics of the structure of the body, and extrapolating them across volume as well as area through the creation of a live/stereoscopic spatial 'grammar'. In doing so, *Choreotopography*was a means of embracing and even magnifying the complexity of dance motion capture data. The semantically blind, highly abstracted space of mathematical analysis represents different approach that enables precise classification of motion capture data, but at the expense of artistic and cultural valence. These two approaches define a domain within which different kinds of motion capture analysis can address both quantitative and artistic/cultural questions about dance. The challenge is perhaps to more closely link the two approaches, and to build more nuanced bridges between the scientific and artistic ontologies involved.

References and Notes:

1. L. Louppe, *Poetics of Contemporary Dance*, trans. S. Gardner (Hampshire, Dance Books Ltd, 2010), 41.
2. G. Deleuze and F. Guttari, *A Thousand Plateaus: Capitalism and Schizophrenia*(Minneapolis, MN: University of Minnesota Press, 1987).
3. V. Mak-Hau, K. Vincs, X. Wang, and K. Barbour, "Classification of Complex Movement Sequences using Motion Capture," forthcoming.
4. L. Louppe, *Poetics of Contemporary Dance*, trans. S. Gardner (Hampshire, Dance Books Ltd, 2010).
5. G. Deleuze and F. Guttari, *A Thousand Plateaus: Capitalism and Schizophrenia*(Minneapolis, MN: University of Minnesota Press, 1987).
6. *Choreotopography*, by K. Vincs, J. McCormick, R. Vincs, D. Skovli, P. Divers, and R. Burt, Gasworks Theatre, Melbourne, 2011.
7. R. Gibson, "Blurring the Boundaries: Performance, Technology and the Artificial Sublime – An Interview with Ruth Gibson and Bruno Martelli, igloo," in *Interfaces of Performance*, eds. M. Chatzichristodoulou and J. Jeffries, R. Zerihan (Farnham: Ashgate, 2009), http://www.ashgate.com/isbn/9780754675761(accessed September 8, 2011).
8. S. Langer, *Feeling and Form: A Theory of Art* (New York: Scribner, 1953).

FASHION HACKING AS SHAPESHIFTING

Otto von Busch

Fashion hacking is a practice where fashion is reverse engineered and tuned to make users "fashionable", using social media to expand transversal tactics in order to reprogram and shapeshift fashion codes. Other traits address the shamanistic rituality of fashion and how participatory practices can expand the realm of fashion beyond the catwalk and ready-to-wear paradigm. Can technologies express the mythical beauty of fashion?

Fashion is transformation. It is a promise of becoming, a vessel of shapeshifting, a craft with which we can navigate across the currents of the social. Fashion is a medium of transgression from this world into the Other; from the world of flesh to the world of imagination and desire. We use fashion to become ourselves, more or better than before. To journey through the realms of imagination is to use the "technologies of the self", the operations of guiding the process of individuation; the formation of body and soul, matter and mind (Martin *et al* 1988). Yet in this text, the focus is not on the struggle between subject and power, but on the techniques which transmorph flesh to desire and reason to the imaginary. We should explore how the mythopoetic and magical consciousness of fashion help us shapeshift in the realm of the social.

Such magical approach displaces this perspective on fashion a little beside the ordinary academic perspective, which is usually withdrawn and secular. This para-academic position will aim at coming closer to the magical properties of fashion to better see its mystical workings. This would mean to not primarily focus on the secular and comparative "religious studies" of fashion, but rather the engage with the belief culture itself, or the "theology" of fashion (von Busch 2008). Whereas the Scientific Revolution and Enlightment strived to establish the order of a withdrawn and objective "science of reason", we must, like shamans and alchemists, seriously consider a "science of imagination" (Harpur 2002). Such perspective, taking an unsettling risk of sounding like new age mysticism, might offer us another understanding of how to hack into the inner esoteric workings of fashion rather than stay on the secular surface of style.

To seriously take up a "science of imagination" could resonate well with the resent attempts to establish a methodology for *artistic research* (cf Biggs & Karlsson 2011). Where reason traditionally deals with the actual and analytical, imagination deals with the possible and associative, or even virtual, visionary and holistic. This world of imagination should not be seen as the opposite of the real, or something fictional, but rather it is at the core of human existence and an extension of the real. While still only embracing the mind of imagination, philosopher Jean Paul Sartre puts it like this; "Imagination is an activity in which human individuals create and recreate the essence of their being, making themselves what they were, are and will become." (Sartre 1972: xx)

Already here we should notice how imagination is not limited in time, to the here and now, but works with an extended moment of relatedness. This world of imagination is a shared social world, including what was and what will become. It is a world of rituals and liturgical protocols. Like a masquerade, imag-

ination is not there to hide us from each other, but to bring us closer to each other: not too unlike fashion. But the shared imagination is also highly material as it is transsubstatiated as a shared manifestation of mind and matter. It is an alter-reality and, according to anthropologist Susan Greenwood, operating is this reality requires a "change in the *mode* of consciousness" to an associative "not only, but also" perception of the world in order to be rendered sensible (Greenwood 2009: 149). To see these associative and sensual patterns we need to don a "magical consciousness" and undo the Cartesian split between spirit can body, mind and matter, magic and science (Greenwood 2009: 4). This would challenge the researcher to train an associative sensibility to better trace what Gregory Bateson called "the flow of relatedness" (Samuel 1990).

We could put fashion somewhere along the axis between magic and science to unravel some of its properties that relate to the technologies of the self, and it is through this dimension we might easier spot the connection fashion has with art. To use the words of Paul Klee: "art does not reproduce the visible; rather, it makes visible" (Klee 1919: 28). In a similar vein, if we consider fashion as something of a religion of consumer society, we should investigate how fashion makes this spirituality visible. Yet, we should not take the mechanisms provided by the fashion industry as our only operational tools, but rather we will need to hack into the mythical properties of fashion. We need to reverse engineer the forces and processes at play and use the hack as a "trickery and manipulation of a system" (Cramer 2003) into the spiritual technologies of fashion.

The system of fashion is a *perpetuum mobile*, a machine in perpetual motion propelled by a "self-feeding, self-sustaining, self-propelling and self-invigorating process" (Bauman 2010: 55). When we are in fashion we manage to synchronize our technologies of the self with the workings of this *futuring apparatus*. Like a magic machine of light, fashion renders our prospective selves visible and radiantly bright. In this way, fashion is a spirited prism or kaleidoscope which helps us see beyond our doom of flesh, or a bonfire guiding our lost ships to the shining lands. Or as put in the movie *The Devil wears Prada*: it is a "beacon of hope".

The technologies of the self help us navigate the continuum between our world of flesh and the Other, or Imaginary. Or rather; they are technologies which help us see how our world is just a fraction of the Other, an ephemeral passage in a vast ocean of the Imaginary. What we consider the world of reason is the mere shadow of the Other. By wearing the skin of an animal the Shaman becomes the spirit of that *spiritus famailiarii*, using rituals to shapeshift through the passages between this world and the Other. Shapeshifting is one of the many means of travelling from the world of flesh, the world of reason, through the obscure passages of the Imaginary. The skin does not reproduce the animal, the skin renders the spiritual passage of the shaman visible. "Skin-shedding is a variation, rich in metaphor, for shape-changing; for it tells us, among other things, that there is only the softest, mistiest skin between this world and the Other." (Harpur 2002: 16)

Shapeshifting is just one aspect of how to take on journeys through the "daimonic reality" (Harpur 2002) of imagination. It is part of what we can call the *occulture of fashion*, where perhaps the most important asset of fashion is its cathartic character. It is a vehicle of purification, a spiritual craft, both a vessel and ability. In its promise of transformation it is a way of leaving the sickness of time behind, of changing one skin for another, one reality for a new for modes of existence. Just like in the movie *The Craft*, where four teenage girls embrace magic to navigate the strained juvenile and transitional angst, it is a period and position of *in-between*, and a balance on a blades edge. This twilight zone puts attention to the *inter-esse* or the in-between explored by Dutch philosopher Henk Oosterling (Oosterling 2009; Oosterling & Ziarek 2011) where modes of symbiotic integration replace the Cartesian atomization and

mechanization of awareness and analysis. As Oosterling notices, to design is to *dasein*, to be in-between, at the inter-being.

The shapeshifting offered by fashion is ephemeral. The combustion of the now, fuelled by desire, is the power that bursts apart the moment to move into the next. In the continuum of time, the continuous shifting character of fashion leaves it active in the time of *Kairos*, of the moment, rather than in *Chronos*, the continuation of time. Fashion is indeed a fleeting moment, a passion, and it helps us escape the chronically actualized suffering of the prolonged persistent. Fashion is the technology of transformation, fuelled by the current of kairos, which makes travel to the Other possible.

Indeed, today we live in times where kairos is at the heart of everyday passion, where cheap fashion allows our everyday with instant gratification, impulsive change and desire permeates our lives. A desire for that next Other moment, the craving, desire, coveting, or that promising daimonic reality we simply wish for.

To be in fashion means to surrender to the elements of time, but also to affect it, be affected and engage in the shaping of time as it washes over your body and through your soul as a mirror darkly. Fashion is not an issue of identity in a static sense, as fashion is always becoming something else, it is a hybrid shape in transit, or even *a sign of motion*. As we step into the changing cabin of the fashion store the mirror offers us to shift shape – "who do you want to be tonight?"

This is the true shamanist aspect of fashion; it offers us a new skin, a passage through the thin membrane dividing the real and imaginary. The fashionista is a shaman, a ritualistic dimension traveller of "spiritual force in which the dream becomes the world-paradigm" (Aldhouse-Green 2005: 172). Using shapeshifting alters the perspective from the engineer's to that of the alchemist or shaman; "to create fire you don't have to first build a match factory; the fire is within the wood and all you need to do is to rub two sticks together until they shapeshift into fire." (Perkins 1997: 25)

The fashion garment is an *objectile*, a product projected into the future, aimed at our aspirations. With the help of fashion, a signifier becoming constantly new and flexible, we can shapeshift into our desired alter ego, liberating the potential of the self, becoming our aspirational representation, someone in our inner wishes, if just for a night. We drape our body in a dream, wordless communication of shared yearnings. A sacrifice of energy to fashion promises inner transformation. It is a continuum; fashion is energy is matter is energy. To shapeshift one "fights fire with fire", challenge the dog by becoming a dog, change shape, change skin. At least this is the dream; by donning fashion one becomes fashion. "What is shapeshifting? In its simplest form, it is changing shape. And what is shape? Shape is a pattern of energy. Change the energy and you change the shape." (Levy & Bruce 2010: 46)

Shapeshifting is change from cellular to personal to legional level to transform in order to transform along the continuum between reason and imagination. We transform from unborn to living, from living to dead, and many times in-between, at every occasion via a rite of passage. The shapeshifting shaman guides his community through the transitions "paving the way for the soul-journey between worlds" (Aldhouse-Green 2005: 174).

Alchemy is the practice of shapeshifting matter. To transpose the energy of substance into another, guiding the flow of becoming towards transubstantiation. In alchemy this is not only an issue concerning form, as in transformation, but the essence of matter and the correspondence between matter and the

transposing will, the soul. The soul of the alchemist had to be purified through ritual, together with the material substances and liquids, otherwise no transition would come to be. Taking on the heritage of Plato's *Timaeus*, this was the *techne*, the art/science of the craftsman, the *demiurgos* (Mohr 1985). As for Plato, the change does not only happen in the realm of the ideal, but is intimately connected to the material crafts, the daimonic techniques of transubstantiation.

What the alchemist or shapeshifter does is breaking into the code of matter or hack the technologies of becoming. The hacker is a dissident crafter, a *design demiurge*. The descendant disciplines of alchemy, chemistry, mechanics, technology, are all codes and programs guiding the technologies of matter as well as the self. In a similar vein we could understand the alchemy of fashion as a technology of code.

Here code does not signify a computer program, but the operating system of matter itself, not too unlike how Manuel DeLanda argues for the actualization of the virtual properties of reality (DeLanda 2002). Code is the command-based shapeshifter, reassembling parts of the actual. Code is the praxis of matter. As noted by media theorist Eugene Thacker; "Code is a set of procedures, actions, and practices, designed in a particular way to achieve particular ends in particular contexts. Code = praxis." (Thacker in Galloway 2004: xxi)

Code is the magical formula of transformation, the enactment of material praxis, like the "hocus-pucus" of the wizard, which generates a transposition of material bodies. Indeed, the magicians' use of "hocus-pocus" derives from the catholic liturgical formula "hoc est corpus meum" – this is my body (Cramer 2005). The religious ritual is executing the technology of self and purifying the soul by confession and redemption. This makes language a special code of religious practice, it puts attention to transformation, just like in magical manifestations and software: "code is the only language that is executable" (Galloway 2004: 165).

The "computational couture", where fashion meets technology (often in the form of electronics), can use the fashion code as actor, actuator, instructor and affector. This was my proposition in the project *Fashion Fianchettos*, where oversized t-shirts were marked with chess coordinates and participants draped the fabric and took notes on the sartorial code of the new shapes (von Busch 2010). These programs explored new ways of disseminating fashion as a set of mathematical functions and minimal algebraic codes, similar to that of chess notations. The result was new drapings that could be sent between fashionistas as Facebook status, Twitter or SMS updates. The project was in itself a code, a praxis, a shapeshifting formula of distributed magic, a spell of transformation, a journey of draping through social media.

Fashion, like most other technologies, works with amplification, facilitation, delegation and in the end; pacification. If we like the promise of the destination, what we see in the mirror, we buy the garment and hook on to the flow of transubstantiation. "Be what you can be". Fashion is a technology that releases new capacities and, user-friendly as it is, leaves us blind to its inner workings. As we use the garment, which is an active choice, we double-click it, yet can't see the code from which it originates and operates.

As shapeshifters we need to become the element we engage with. Just like the fire is *inside* the wood, fashion is *inside* the technology of the self. We ally with the energy of fashion. Reverse engineer, hack and shapeshift. We trace, delineate and become fashion in order to change fashion into what it can be. With a participation of the senses, a cultivation of attention and engagement of skills we can form an

open culture around how to approach wearables through the shapeshifting character of fashion amplifying and intensifying the technologies of the self.

One student at the Fashion and Technology course I ran at K3, Malmo University, Jenny Nordberg, engaged with the stigmatizing processes of fashion. Jenny's argument was that the worst critique you can get for your appearance is silence from your friends. Thus the "digital bruise" shirt was a shirt reacting on a sudden silence. If the ambient noise level dropped the microprocessor activated a hidden aquarium pump, which started "bleeding" out invisible ink from within the shirt. This caused the fabric to bruise until someone started comforting the wearer, that is speaking and once again raising the ambient sound, thus stopping the process. The invisible ink started fading away after a few minutes, "healing" the bruised social wound. This shapeshifting process used wearables to reveal some of the mythic properties of fashion, using several media to shapeshift the wearer and render some of fashion's inner workings visible as social skin.

In Nordberg's example, a microprocessor was used to uncover an everyday feeling of discomfort caused by fashion, revealed through shapeshifting, and also the social rituals that recover the face of the wearer. Every culture has specific social ceremonies connected to appearance and the social skin. Rituals of welcoming and departing, protection against the weather, curses and bad luck. Often they also have specific craft objects to safeguard the wearer. Take for example the evil eye, the gaze of envy, the magical and malevolent gaze (so common in fashion); "The opposite of the gaze of love is not the gaze of hate, but that of envy, passive, unliving in itself, vampirically attracted to the life in others." (Bey)

The Evil Eye is a jinx called forth by the sin of envy – protection can come from symbolic talismans projecting the "good eye", sometimes called the "eye of Abraham" (Ulmer 1994: 11f). With what craft of imagination do we render the good eye visible today?

Here local crafts can play a central role. Not in an exotic sense but with the tracing of the migrations of skill we can find new patterns of relations, new inter-esse in the occulture of fashion. For this we should not only be embracing the techniques of craft but also the folk belief, cottage worship, rural base communities and the local cultivation of esoteric imagination. What does the local demiurge do? What daimonic reality does he conjure through his craft? What does the witch craft?

If we take on the exchange of crafts seriously, not only in simple techniques, but the sorcery of sensory of imagination, we can truly enrich the toolbox for exploring the potential of wearable electronics and "smart textiles". These are the forces and codes we can hack, plug-in, and intensify into new empowering technologies of the self. This local engagement with mythopoetic craft can be the alter movement to the hackerspaces; a distributed heresy similar to that of the Movement of the Free Spirit and a cultivation of the human spirit towards the true "alchemy of the self" (Vaneigem 1998).

Turn passive believers into engaged users; leave no hands idle. Show the fashionistas there is only the softest, mistiest skin between them and their manifested imagination. Release the open culture, share the code and educate the mechanics of the self how to surf on the flow of fashion and become fashionable.

Shapeshift. Become a warlock of vogue, an enchanter of fashion, a *magus à la mode*.

References and Notes:

Aldhouse-Green, M & S (2005) The quest for the shaman,
Bauman, Z (2010) "Perpetuum Mobile", in Critical studies in fashion and beauty 1 (1)
Bey, H : "Evil Eye"
Biggs, M & Karlsson, H (2011) The Routledge companion to research in the arts,
von Busch, O (2008) Fashion-able: hacktivism and engaged fashion design,
von Busch, O (2010) "Fashion Fianchettos – Text, Program, Fashion" in ArtMonitor Iss 8
Cramer, F (2003) "Social Hacking, revisited"
Cramer, F (2005) Words made flesh: code, culture, imagination,
DeLanda, M (2002) Intensive science and virtual philosophy,
Galloway, A (2004) Protocol,
Greenwood, S (2009) The anthropology of magic,
Harpur, P (2002) The philosopher's secret fire,
Klee, P (1919) "Creative Credo" Schöpferische Konfession,
Levy, R & Bruce, E (2010) Shamanism,
Maertin, L, Gutman, H & Hutton, P (eds) (1988) Technologies of the self,
Mohr, R (1985) The Platonic cosmology,
Oosterling, H (2009) "Dasein as Design, Or: Must Design Save the World?",
Oosterling, H & Ziarek, E (2011) Intermedialities,
Perkins, J (1997) Shapeshifting,
Samuel, G (1990) Mind, body and culture,
Sartre, J-P (1972) The psychology of imagination,
Vaneigem, R (1998) The movement of the free spirit,
Ulmer, R (1994) The evil eye in the bible and in rabbinic literature,

EVOLVING SPACES ALONG NETWORK TECHNOLOGIES

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Evolving Spaces Along Network Technologies

The research project Public Space 2.0 – Evolving Spaces Along Network Technologies, focuses on the mutual relationship of physical urban spaces and virtual communities established by social networks. Our main interest is directed towards experience-based, lived-through knowledge, gained as today's citizen/users continuously take action in multiple public domains, both physical and electronic. As an interdisciplinary research group, we proceed from theoretical models that depict (public) spaces as a multiplicity of social spheres to overcome well-worn dichotomies: e.g. public versus private. In what follows, we will argue why we are using a methodology deriving from arts based research. We will exemplify our stance towards the field of research, by introducing a project driven methodology to augment design research in the realm of public spaces. We will start of by presenting and then critically reflecting theories of public spaces. Then we will summarize methodological commitments we admitted to and give reasons for each. Finally, we will talk about a series of workshops the group has conducted and will conduct to foster and elaborate our arguments and methodology.

Considering Space

Three well-known models of public space form the basis for many premises of the present work. The models considered share a similar diagram, that is, public spaces as a webbed interlocked multiplicity of possible spaces, a diagram, however, that has been deciphered essentially different by three different authors. We start off with these models, the models by Foucault, Deleuze and Habermas, because All appear to share the dilemma concerning the urge to unbundle the traditional concept of unified, bourgeois public space. Furthermore, their shared structure resembles what researchers claim the structure of the Internet is like.

(1)

The model of Heterotopia proposed by Michel Foucault suggests multiple spaces, as they constitute an endless unstructured puzzle of equal aims. "Bachelard's monumental work and the descriptions of phenomenologists have taught us that we do not live in a homogeneous and empty space, but on the contrary in a space thoroughly imbued with quantities and perhaps thoroughly fantasmatic as well."
[1] Foucault talks of anti-public spaces, appearing forbidden, privileged or holy; marking spaces of transition, crisis or deviation. Assuming, that the exterior is no more constituting for the inside, we have to understand Foucault's anti-Publics as folds of the exterior, while basic categories of inside and outside remain undefined. Foucault maintains that we can recognize the aim for the Public to emancipate itself from the universalism of the bourgeois public.

(2)

Another model promoted by Gilles Deleuze envisions subtly differentiated urban public spheres: the literary public sphere no longer differs from the partly political, subcultural, or artistic public sphere. He rejects a possible outside or center, but rather envisions a de-centered space system, naturalized, non-political, occupied with natural metaphors, almost like a substance rather than a spatial category. "The State no longer has its disposal the political, institutional, or even financial means which would enable it to fend off the social repercussions of the machine; it is doubtful whether it can eternally rely on the old forms like the police, armies, bureaucracies, even trade union bureaucracies, collective installations, schools, families." [2]

(3)

Finally, the Habermasian model renders the public as some kind of super-brain, a space of rational, informal and normative deliberation. However, the plurality of partial public spheres is absorbed by a positive principle of communicative reason, as assumes that public affairs by nature lead to democratic processes and the increase of collective reflection. [3] Habermas therefore relates to one great Public in which citizens may exchange arguments autonomously about how things are run. But in his model, the public takes on a higher order of meta-public, as the dimension of the public does not include public phenomena such as mass media as non-reasoning public instance.

CRITICAL REMARKS

For the present project and paper, we find ourselves in need of appropriating, if not redefining, these contemporary models describing means of space production. The models we mentioned shall help us to specify an appropriate methodology to approach the kinds of spaces produced by virtual world overlapping physical ones. Jürgen Habermas, as he tends to unify public space by rationalizing its conflictuous potential, denies existing social antagonism as inherent paradigm of the public today. In the context of democratic systems, any dimension of public affairs would by definition reproduce democracy in its constituting structure of meaning, as non-democratic impulses would equally remain external to the list of criteria describing public domains. In this sense, he stays with a traditional, humanist notion of hegemonial space, denying crucial distinctions between society and its constitutive elements. Today, economic demands are presented at the same ontological level as for instance cultural demands. Class politics have to construct and articulate a common chain of equivalences with others in the field of politics. Ever since the introduction of digital networks, the concept of hegemonial space no longer seems congruent with current readings of complex space phenomena detached from antagonism and ideology.

Following the post-Deleuzian assumption, the Internet takes on characteristics of a social, public realm. Functioning as floating space system without centers, the main focus became directed at the negation of hierarchy and central organization. Hence, from political theory we have learned that no system ever exists without a center, but then there is none not aiming for centrality as every signifying system aims for symbolization. Total absence of centrality would eventually lead to a radically static status: "Therefore if the Internet was without center, we then had no dislocation which would imply no production of meaning, a frozen world of complete transparency in which every sign would be forced to stay with its natural reference." [4] Taking this as a convincing argument against any further space analogy, we once more turned turn back in history to the methodology of the Situationist movement, established in the late 1960s by the Situationists International. Often associated with the 19th Century mode of "flâneurie", which was introduced mainly in the texts of Charles Baudelaire and Walter Benjamin, the

act of moving in the city took on expanded meanings after 1960s through interventions that were carried out by the Situationist International. When the small group of Situationists teamed up to critique authoritarian strategies of urban planning, one of their interests was what urban planners chose as relevant for their considerations. Taking the subjective view into account, Situationists argued that the city is a collage of individual images stitched together, overlapping and intersecting.

CONSTITUTIVE ASSUMPTIONS

As portable, pervasive, location-sensitive, intercommunicating devices converge with social practices, technologies have become increasingly useful to groups as well as to individuals. [5] The power of smart mobs reaches back to practices surrounding trust and cooperation, as they are being mediated by new communication and computation technologies. [6]

Digital networks have introduced properties such as decentralized access and distributed outcomes, simultaneity, and interconnectivity. While in electronic financial networks distributive effects have led to higher levels of control and concentration in global capital market, in electronic activist networks properties contribute to distributive outcomes: greater participation of local organizations in global networks help constitute transboundary public spheres centered in multiple localized types of struggles. "These are politics which are partly embedded in non-digital environments that shape, give meaning to, and to some extend constitute the event. These forms of activism contribute to an incipient unbundling of the exclusive authority, including symbolic authority, over territory and people we have long associated with the national state." [7] The Sociologist Saskia Sassen refers to "layer ecologies", by which technological properties start to become mobilized. Former unitary bodies of knowledge belonging to specific categories were often housed in closed institutions, start to become disassembeld in small pieces across diverse institutional ordering systems, which then can feed into new conditions including the political, economic, technical, cultural and subjective. The placeless world of wireless communications starts to interact with the place-specific networked computer chips that are beginning to infiltrate buildings, furniture, and clothing. The emphasis lies less on the empowerment of people but rather around the significance of becoming actors.

Methodological Commitments

What the Situationist did and how they did it has a second very important implication crucial to the research project we are engaged in: leaving the save haven of theory, taking part in the field we observe, we also substitute objective view to subjective vista. The very possibility of objectivity in the sciences has been questioned by many postmodern thinkers, our methodology seeks no objectivity but intermingling of various points of view. Those points of view, we felt must not leave aside the view of the actor. The Situationists actively engaged in urban public spaces in bodily means through invented techniques such as the dérive and aimed at capturing subjective experiences through psychogeographic mapping. Influencing other conceptual art movements like Fluxus and Performance Art, the Situationists provided a relevant base for thinking about how individuals may reconfigure political meanings of public spaces. This practice and theory we found to be very helpful to communicate between the fields and points of view.

Based on interdisciplinary collaboration, we cannot be content with pure theoretical reasoning. We found it to be seminal to embed theory in practice and inform it with methodologies established in the

long line of art projects, staged in Western public space. We feel that it is insufficient to only observe and describe public spaces. We felt it is essential to engage and participate in the medium to gain more thorough insight.

Working in the much discussed and little settled filed of "arts-based research" we have to brave methodological discussions, discussions we find necessary to outline in that paper. Our primary premise is staging our arts-based research as a practice with a distinct focus, but with an open-ended process. We set as an experimental procedure in this context, as a journey that could be driven by a desire for discovery in a collaborative environment and shaped along the way through steps taken one after another. Our approach can be identified with what Donald Schön would call "reflection in action", that is to say, to be able to accumulate knowledge on what one works on, while working on it. Thus, we were required to set a process that might allow 'potentiality' to last forever, to define the theme and direction as clear as possible, but at the same time, to avoid forming predetermined estimates for the results.

Going there, engaging, working in those virtual and physical public spaces, is part of that process. As researchers we include discursive fields an increasing list of art projects have opened.

Exemplifying methods

The piece Free the Listening, Joo Youn Paek exemplifies what we seek to expose. She proposes new possibilities for temporary intimate sharing environments to appear. Paek fits a pair of headphones with an additional pair of earpieces that face out, so that total strangers would feel invited to lean over and share the experience of listening to music with the wearer. By making a minimal adjustment in an ordinary everyday technology, Paek ruptures the image of self-sufficient individuals that move in the city within self-enclosed bubbles of sound. The wearer becomes an active provider of a personal choice of resources, as well as capable of playfully influencing others.

Another project that modulates personal sound environments in urban contexts is the Sonic City by Ramia Mazé, Margot Jacobs and Lalya Gaye. The wearable interface of the Sonic City uses gestural movements of the wearer as well as environmental influences that are detected by a set of sensors for personal music creation. That is to say, not only the individual becomes the actual producer of the music through simply moving in the city, but also the personal sound bubble becomes highly context aware, unstable and mutable by external factors. Thus, this piece portrays another type of human agent that creates shared environments not necessarily by actively providing resources, but quite on the contrary, by becoming sensible and capable of mindful observation, absorption and inclusion.
Investigating in the spaces created virtual and physical we make us of projects and inform them with theory. Working as a group that includes engineers we appreciate the hands-on approach the field uses and used to gain their insides. As a critique, we think that especially in the race for theory, the will and courage get the hands dirty has suffered in the last years, or, to be exact fieldwork labeled non-scientific was seldom recognized by those producing the texts. This kind of scission was alien to the Situationists and so it is to our group.
A project we build and tested seeks possibilities to help, assist and foster researchers in public space, by providing a set of sensors and recording tools for fieldwork. These tools can be rearranged and adapted according to the needs of a certain task.

Mobile Sensor Data

We built a kit researches, especially in academically context, can wear to aid and augment their research in as well physical and virtual public spaces. We want to establish a tool that can help to record, track and detect phenomena in the spaces enquired upon, but not ignoring or limiting the interpretation skills and theory building of the researchers: we are not doing what is called hard sciences but building a prostheses for researchers to boost their fieldwork.

Design Research Augmentation Kit: The First Prototype

The first kit was tested in a workshop at PennDesign in Feburary 2011. We provided the students with a wearable device that allowed them to sense and store a variety of data while on the move in urban spaces. The students were encouraged to creatively employ the kit in tracing phenomena concerning their spaces of interest and visualizing their research. Conducting the workshop, our main concern was to engender 'agents' that can mindfully get closer to the phenomena of interest. Second, we aimed to observe how the awareness of being augmented by such technology could foster creativity in different ways. Throughout a weeklong workshop, students developed projects that spread from what sociology refers to as "breaching experiments", to performative pieces, to spy-like endeavors and 3d animations that made use of the registered data.

The wearable kit was composed of two devices that registered two types of data: (1) The environmental device collected data concerning the agent's immediate environment such as GPS position, surrounding WIFI networks, as well as temperature, lig sound ht and intensity. This device was composed of custom built environmental sensors connected to a small notebook that ran the recording and synchronizing software, all wrapped within a shoulder bag. (2) The personal device on the other hand, was a smartphone with a special recording software that kept track of personal communication activities of the agent, such as phone call and SMS logs, visited URLs, and taken photographs.

Reflection in Action

The workshop started with our introduction to the software and hardware of the wearable kit to students and progressed with setting up individual project proposals as well as developing research strategies for each project. Our interest was not only focused on the concrete results, but also on the ways students appropriated the kit in their field trips as well as their individual impressions and excitement about the experience. In personal meetings, we observed how students carried out a "reflection in action," spinning in their theories back and forth, building, testing and revising them along the process.

Techno-Artifact as Reflector

At this point it is important to state that the technology used in this first experiment is by no means meant to be permanent; it is fully open for debate and to be continuously improved. Our aim is to avoid treating the technology as an ultimate solution, but to understand it as an artifact open for evolution. Thus, we seek for possibilities for future students with little or no experience to be engaged in developing hardware and software and manipulating the wearable kit. We believe this approach will let us examine the kit as an artifact that has been informed by various public spaces at a later point in the project. Looking at the kit, we might get a chance to acknowledge a collection of subjective views on public

space and the phenomena that shape these views. We think of the kit as a precious artifact, as all the adjustments, fixtures and add-ons reflect researchers interest in public space – hence, like a broken image reflected in shards, reflect fragments of public space itself. In the same way technologies are shaped by social structures and politics this kit has been shaped and we seek to reverse-engineer what was going on.

FINDINGS AND PROSPECT

In closing we would like to summarize the varying layers of examination and propose a few critical aspects our observation might point to.

Working in the field of architecture, urban planning and building technology, we are still confronted with strong limits regarding the underlying political frameworks reflected in merely top-down planning procedures. Technical properties of electronic interactive domains may soon be included in the list of planning parameters to study and learn about extended forms of communication and social organization. We believe that academic researches leave many phenomena of public space unconsidered, due to constrains of what is regarded as being science. The relevance of the social and the subjective as non-technological variables as well as the particular cultures of use of different actors are relevant to both digital and social networks. As we increasingly learn about the logics and dynamics of electronic network technology, we are given the opportunity to integrate empirical findings of social logics embedded in diverse domains. In this context, open source can not only bring technical consequences, but also social ones. As Saskia Sassen keeps saying, new knowledge practices allow for informal knowledge (versus institutionalized) to get distributed and inform our use and appreciation on communal space. [7] In our research project we hope to contribute to how we may learn to include the subjective within an increasingly objectified world. As digital networks have shown, that distributive power does not necessarily lead to the reinforcement of democratic structures, we believe that designers next to other planning instances will have to start to accept additional political responsibilities.

References and Notes:

1. *M. Foucault and J. Miskowiec, "Of Other Spaces," in Diacritics 16, no. 1 (1986): 22-27.*
2. *C. V. Boundas, "Politics," in The Deleuze Reader (New York: Columbia University Press, 1993), 256.*
3. *J. Habermas, Strukturwandel der Öffentlichkeit, Untersuchungen zu einer Kategorie der bürgerlichen Gesellschaft (Frankfurt am Main: Suhrkamp, 1990), 90.*
4. *O. Machart, "Art, Space and the Public Sphere(s): Some Basic Observations on the Difficult Relation of Public Art, Urbanism and Political Theory," Transversal, no. 1 (2002), http://eipcp.net/ http://eipcp.net/transversal/0102/marchart/en eipcp (accessed June 1, 2012).*
5. *H. Rheingold, Smart Mobs: The Next Social Revolution (New York: Perseus, 2002), 161.*
6. *A. Blumauer and T. Pellegrini, eds., Social Semantic Web (Berlin, Heidelberg: Springer-Verlag Berlin Heidelberg), 455.*
7. *S. Sassen, Saskia, "Informal Political Knowledge and its Enablements: The Role of the New Technologies," (lecture, Shaping the Digital Society in Bündnis 90/Die Grünen, Netzpolitischer Kongress, Berlin).*

THEORETICAL DISCOURSE ON "ART, SCIENCE AND TECHNOLOGY COLLABORATION" AND ITS HISTORICAL DEVELOPMENT

Lioudmila Voropai

The paper analyses historical development of a discourse on "Art, Science and Technology collaboration" from the 19th century till the present. It reviews the key concepts used for a theoretical and cultural legitimization of this collaboration, and implications of the "collaboration"-discourse for a media art practice.

 "I forgot who was the famous philosopher who used to quip that all was well with the social sciences except for two tiny words: 'social' and 'sciences' – with these words Bruno Latour begins his famous article "When things strike back - a possible contribution of science studies." [1] One could probably slightly modify this introductory rhetorical construction to introduce also the most popular subject in the today's media art discourse: Actually, all is well with the "art-science collaboration" except for three tiny words: "art", "science" and "collaboration".

Surely, a "fruitful collaboration of art and science" has a long and rich history and its importance is not to be questioned. But the problem that we are going to analyse in this paper is the growing instrumentalisation of this subject caused by current tendencies in cultural policy and its consequences for a contemporary media art practice.

A common allegation that this "collaboration" is indispensable entails a danger to eliminate not only practically, but also discursively an old good modernist autonomy of art. Attempts to make the system of art education and art practice itself more academic and more 'scientific' are not just an outcome of the notorious Bologna-process, but also a manifestation of some much older structural problem resulted from a traditional role of contemporary art in the society. The worse its precarious position gets, the more intensively a mutual enrichment of both art and science through their fruitful collaboration and the perspectives of their desired symbiotic future are depicted. Publically expressed scepticism and irony towards this agenda are perceived as a kind of a guild interests betrayal and career suicide. The functioning of today's ideology machinery is not any more based on a classical Marx' naiveté-model "They do not know it, but they are doing it", but rather, as Sloterdijk and Zizek have already poited it out, on a maxim of the so called "cynical reason": „They know very well what they are doing, but still, they are doing it." [2]

"We know very well that "scientification" of art often brings quite dubious artistic results, but in spite of that we still make it to our official agenda" – this statement could be an articulation of a common attitude within an institutional art and especially new media art field. Because an integration of media art theory and practice into an academic science context promises at least few jobs and teaching positions, while critical questioning usually ends up with an absolutely unbeneficial resentment.

These observations prove an efficiency of familiar repression mechanisms in service of ideology apparatus, which transform this "cynical reason" background into some saving "new naiveté" that noticeably

coins the present discourse of "art-science collaboration" and invites for an application of discourse analysis methodology in its classical Foucauldian version.

Let us first briefly overview a conceptual history of this discourse and some key notions that were used to theoretically legitimize this "collaboration".

The Renaissance-career of an artist from a simple craftsman to a man of universal knowledge is a well-studied subject of art history. Functional division of labour between art as producing *techne* and science as analytically-contemplating *theoria*, articulated already in Plato's and Aristotle's texts, is often considered to be left aside in early Modern epoch. The whole history of Fine Arts from the treatises on central perspective in the late Renaissance to manipulations with DNA-code in bio-art projects is supposed to deliver further proofs of the on-going "scientification" of art. But actually this process proves only the fact that the old, by Plato established hierarchy, in which scientific activity has a higher social status than artistic one, remains essentially unchanged. However the reason for this higher prestige of science has changed as well as a factual content of scientific activity.

Science today is not anymore some pure self-sufficient reflexive and contemplative *theoria*, but, similar to any other forms of current public production, is a complex of rational goal-oriented activities, aimed at achievement of particular practical results. Being oriented primarily at solving certain practical problems natural sciences take today in economical perspective entirely different position than contemporary Fine Arts with an essential for their conceptual identity claim for autonomy. This inevitably shifts an economic value of Fine Arts into a category of luxury and "status symbol" goods. Natural sciences are considered to be 'useful' for a society and (even if in a long-term perspective) economically efficient, while Fine Arts can be only partly used as storage for a temporary economical surplus. In addition, this temporary storage can only function, if its real economical meaning is kept hidden behind the façade of the key ideological concepts that build bourgeois notion of art, such as "creativity", "geniality", "self-expression" etc.

Historical basis of this economically grounded demarcation is a direct use of scientific achievements for technical innovations during the period of the so-called "industrial revolution". In his early text "Technical Progress and Social Environment" famous German social philosopher Jürgen Habermas has pointed out that pre-industrial forms of practical professional activity didn't imply any connection with the theory. [3] Only with the process of industrialisation a systematic implementation of scientific achievements in the practice has been started. Natural sciences thus became a source of new technologies and inventions, which could result from this implementation.

This was accompanied with the process of institutionalisation and professionalization of sciences themselves, which was manifested in a differentiation of different scientific disciplines and establishment of particular institutions like Academies of Science etc. A new social group of professional scientists has emerged, who were driven in their undertakings not only by a kind of "the will to knowledge", but who also could make their own livings out of this activity. This process is also manifested in the English-speaking context by an emergence of the very notion "*scientist*", which slowly replaces some earlier terms such as "*natural philosopher*" or "*man of science*".

British polymath William Whewell has introduced the term "*scientist*" in one of his texts published in 1834 in *Quartely Review* as a reaction to a changing character of scientific work. This introduction had first a slightly satirical tone: „by analogy with *artist,* they might form [the word] *scientist*, and added that there could be no scruple in making free with this term since we already have such words as economist

and atheist." [4] But later, in his *"The Philosophy of the Inductive Sciences" (*1840) Whewell was not anymore ironical about this term: „We need very much a name to describe a cultivator of science in general. I should incline to call him a *Scientist*. Thus we might say, that as an Artist is a Musician, Painter, or Poet, a Scientist is a Mathematician, Physicist, or Naturalist." [5]

But a real popularity the term *scientist* has reached only at the end of the 19th century. Opposite to German term *Wissenschaft,* French *science* or Russian *наука*, the use of the word *science* in the English-speaking context became reserved for exclusively for natural sciences related activities, while *humanities* (in the continental Europe largely known as *Geisteswissenschaften*) could hardly claim for the status of scientific activity. Since Francis Bacon British "men of science" were primarily empirically and practically experimental oriented, in contrast to their continental colleagues with their affinity for voluminous metaphysical speculations. A notoriously pragmatic Anglo-Saxon spirit has conceived practically useless non-profit *humanities* as a kind of wasteful, but in fact pretty harmless pastime for „*gentlemen of leisure*" with „old money" and „old privileges" similar to *Fine Arts*.

Following this general 'ideological' predisposition the theme of an interaction between *art* and *science* in the 19th century implies first of all the question, what Fine Arts can learn from Sciences in order to become 'finer'. A theoretically articulated programmatic rapprochement of art to science, e.g. to scientific knowledge and methods, had initially a purely instrumental background. For instance, John Ruskin in his „*Lectures of Art*"(1870) and in *„The Eagle's Nest. Ten Lectures on the Relation of Natural Science to Art"*(1872) claims that landscape painter should study biology and geology and also use scientific drawing methods, to be faithful to the nature in their works, which is, according to Ruskin's theory of art, one of the main virtues of Fine Arts. [6]

A further development of an instrumental approach to scientific knowledge and methods and their use for artistic purposes one can find at the beginning of the 20th century in the theory and praxis of Russian constructivism of the 20ies and in the study programs of Bauhaus.[7] The famous constructivist concept of "artist-engineer" should not be misunderstood as a sort of prelude to the today's "art-science collaboration" agenda. Prominent representatives of Russian constructivism, such as Alexander Rodchenko, Warwara Stepanowa or Alexei Gan, spoke about „production art" (russ.производственное искусство), which makes a radical break with the *l'art pour l'art* attitude and formal aestheticism of traditional Fine Arts and offers instead an agenda of a better designing of human material environment. The new type of artist – "artist-engineer" – should resign traditional art forms like panel painting and „consciously manufacture useful things", i.e. s/he should get involved into designing and production of functional objects. A prominent LEF-theorist Boris Arvatov wrote in one of his articles that the mission of a modern artist is "not to depict a beautiful body, but to educate real and harmonic people, not to draw a wood, but to plant parks and gardens, not to decorate walls with paintings, but to paint these walls." [8]

The notion of "production art" breaks in its basic attitude with the modernist ideology of art autonomy. The "production art" as such is an important theoretical forerunner of the contemporary conception of design; therefore an "artist-engineer" should be understood rather as a designer than as an artist in a conventional modernist sense.

 In the first half of the 20th century artists not only very often refer to the modern scientific theories, but also apply some newest technologies in their artistic practice. However this turn to science and technology does have yet neither from the art-historical, nor from discourse-historical perspective any programmatic strategic character. A proclaimed "collaboration" of art, science and technology as well as

certain "scientification" of art practice becomes a more or less articulated agenda only in the 1960ies, largely due to the cultural policy situation in the USA at that time.

In a situation of the armaments drive and generous support of research projects in the field of computer technologies during the Cold War in the USA, American universities and research institutes became a feeding ground for experimental technology-based art projects, which could provide a needed technical production base.

Numerous new art forms, practices and –isms emerged out of intense late-modernist impetus of the post-war art. They developed further a conceptual heritage of the early modernist art (from Dada and Supremathism to Constructivism and Bauhaus) and transformed it according to the changed social and technological environment. Endlessly created new art isms represent this wide range of artistic experimentation with new technologies, materials and scientific conceptions – *Computer art, Algorithmic art, Generative art, Inormation art, Evolutionary art, Process art, Systemic art, Cybernetic art, Kinetic art, Fractal art* and so forth, and so on.

These artistic experiments needed of course a production base, which goes far beyond the possibilities of traditional artist studio. Art institutions of the 60's-70's could offer only exhibiting spaces for a public presentation of these artworks. Appropriate production facilities could be however found only outside of the art institutions context of that time.

Laboratories and research centres at the universities offered in contrast to art institutions not only some technological and material production base, but also support from engineers and programmers, indispensible for a realisation of these artistic projects. This is of sure not a coincidence that many pioneers of computer- and technology-based art come precisely from this context and have their background in natural or computer sciences and engineering.

To mention only the most known examples, a famous pioneer of *interactive art* and earlier artistic experiments with *virtual reality* and *augmented reality* Myron Krueger was a computer scientist, who in the 70's has worked for computer graphics projects at the *Space Science and Engineering Center* at the *University of Wisconsin-Madison.* Due to this job he could get a technical support of his artistic projects from a University staff.

A founding editor of *Leonardo-Journal* and devotee of *Kinetic Art* Frank J. Malina was originally an aeronautical engineer. Many European techno-art activists also came from similar professional contexts. A well-known Austrian enthusiast of computer art and computer graphics Herber W. Franke received his doctorate in theoretical physics in 1950 by writing a dissertation about electron optics. One should not forget here also Roy Ascott, who, before starting his artistic career, was an officer in the British Royal Air Force working with radar defence systems.

From the historical sociological perspective in the second half of the 20th century precisely scientific and technical manpower was primarily a feeding ground for a technology-based art, which has essentially influenced some of its aesthetical and conceptual particularities. Many protagonists of early techno-art were professional engineers, programmers or scientists, who out of various reasons have developed their interest for artistic use of some new technologies. With their technical-artistic experiments they were *stricto sensu* hobby-artists, who, from a sociological perspective, have been producing a sort of 'technological Art-Brut.'

In this respect one could also say that many early technology-based art projects, whether in the field of *Kinetic Art, Holography, Computer Art, Interactive Art, Virtual Reality* or something else, were to a certain extent side-products and experimental deviations in a functioning of different research institutes and scientific laboratories.

Only later these products of rather creative than artistic in a strict sense activity were perceived within an institutional art field as art objects and interpreted as an extension and further development of the modernist art concept. The idea of "Collaboration of Art and Science and Technology" became thus pivotal for a conceptual self-positioning of New Media Art in the 80's.

A critical analysis of the discourse on "Art-Science collaboration" discovers also certain topoi, which play a noticeable role for a theoretical conceptualisation of this subject, although this role was taken due to some initial principal misunderstanding. One of these topoi, which is largely referred in numerous works on history of the "collaboration", is the famous text "The Two Cultures" by British scientist and writer Charles Percy Snow. He describes an essential difference between the *science* culture and *humanities* culture, i.e. between the working methods, canons, systems of values etc. of „*scientists"* and „*literary intellectuals*" (that is how Snow defines representatives of humanities). His main pathos is to settle account with a notorious intellectual arrogance of *"literary intellectuals*", and it is absolutely unclear, what techno-arts have to do with the contraposition of these "two cultures". Since if they are supposed to have something in common at least with one of them, then it should be rather a kind of 'genetic relationship' with *science*and not with *humanities* (at least precisely this suggest the most publications on this subject).

That is also why the whole "*third culture*"-motive, which is very common in the media art discourse since 90ies, is based on some fundamental misinterpretation of both the Snow's position as well as main statements of the book „*The Third Culture: Beyond the Scientific Revolution",* published in 1995 by John Brockman, an American literary agent and author specialising in scientific literature. In contrast to Snow, who optimistically wrote about a possible "*third culture*", in which fundamental differences between *science*and *humanities* can be abolished through the communication between their representatives, for Brockman "*the third culture*" is represented by scientists, who are able without a mediation through literary intellectuals to present themselves the newest scientific developments to the general public.

Despite these definitions the term "*third culture*" was in the 90ies often used in the media art discourse to position media art itself as a new kind of the "*third culture*".[9]An intention of this positioning is quite clear – art, which works with technologies (i.e. media art par excellence), should be established in an academic institutional context and socially legitimized as a kind of mediator between science and general public.

Especially in the USA, where media art institutions were not that actively founded and generously supported by the state as in Europe in the 90ies, media art had a chance to institutionally survive only under the roof of universities and other academic institutes. Teaching and research positions in the academic field became for media artists almost the only professional option to make their living. But even if this positioning tactics in a sociological perspective is very understandable and even unavoidable, one should not ignore those conceptual problems and contradictions, which in a long-term, strategic perspective can lead media art to a real dead end.

Through accepting this merely mediating position, media art basically reduces itself to a kind of popular-educating and purely illustrative work. As a matter of fact, only through an abdication of its artistic autonomy and functional self-sufficiency media art can obtain an approved place in a social system. However the main question, which this situation provokes, is the following one – why does media art that positions itself in this way still need this disputable "art"-addendum, which only brings various practical complications and theoretical contradictions into this kind of activity? Why it does not call itself simply an audio-visual-spatial-etc. design and representation of scientific knowledge and technological achievements, which it does in fact?

Looking back to the history of art in the 20th century this would not be such a radical move. Was the "production art" of Russian constructivists not the first sober perspective onto upcoming tasks of art in light of its disappearing monopoly of visual production due to technical inventions such as photography or cinematography? Or was it not proclaimed by Gene Youngblood in "Expanded Cinema", that artist should become a "design scientist" and practice an "aesthetic application of technology?" [10]

The "art"-label in the whole today's media art enterprise should probably simply help to keep at least some tiny free space in an increasingly efficiency-oriented academic context of the present neoliberal policies. In addition, the term "art" in a mass reception is still reserved for some imagined romantic terrain of an alleged "freedom of individual self-expression", which keeps on recruiting new apprentices into a shrinking media art guild.

References and Notes:

1. *B. Latour, "When Things Strike Back: A Possible Contribution of Science Studies," in The British Journal of Sociology 51, no. 1 (2000): 107-123.*
2. *See S. Zizek, The Sublime Object of Ideology (London-New York: Verso, 1989); also P. Sloterdijk, Kritik der zynischen Vernunft (Frankfurt am Main: Suhrkamp, 1983).*
3. *See J. Habermas, "Technischer Fortschritt und soziale Lebenswelt," in Technik und Wissenschaft als "Ideologie" (Frankfurt am Main: Suhrkamp, 1968).*
4. *Quoted in R. Holmes, The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science (London: Pantheon, 2008), 449.*
5. *Ibid.*
6. *See J. Ruskin, Lectures of Art (New York: Allworth, 1996).*
7. *See W. Kandinsky, "Farbkurs und Seminar," in Staatliches Bauhaus Weimar 1919- 1923, ed. Karl Nierendorf (Weimar und München: Bauhaus, 1923).*
8. *Boris Arvatov, "Utopia and Science," in Lef, no. 4 (1923): 16-21.*
9. *See for example, V. Vesna, "Toward a Third Culture: Being in Between" in Leonardo 34, no. 2, (2001): 121.*
10. *G. Youngblood, Expanded Cinema (New York: Dutton, 1970), 189.*

BEYOND THE CONFLICT OF THE FACULTIES: A NEW INSTITUTIONALIST CASE STUDY OF THE FOUNDING OF A RADICAL TRANSDISCIPLINARY ART/SCIENCE/TECHNOLOGY PROGRAM

Charles Walker

This paper introduces a critical study of the ideas, agencies and structures involved in establishing an innovative transdisciplinary degree program. Drawing on interview data, it develops an account of the day-to-day lives, experiences and practices of academics, students, practitioners, administrators and other stakeholders operating in increasingly institutionalized electronic arts/science/technology environments.

In 2005, Auckland University of Technology drew together four existing Schools (Art & Design, Communications Studies, Computing & Mathematical Sciences, and Engineering) into a new Faculty of Design and Creative Technologies. In 2007, the Faculty formed an Interdisciplinary Unit to build new experimental research and learning experiences across these overlapping disciplines. The new Bachelor of Creative Technologies degree discussed here is a key part of this larger Faculty project.

Over the last decade there has been renewed interest in interdisciplinary education (Chandramohan & Fallows 2008). However, there have been relatively few explorations of the experiences of academics and students in such programs, or of how they actually learn across changing epistemological boundaries (Robinson 2008). This task would seem to be important, especially given the differing motivations for interdisciplinary research; ranging from top-down imperatives from administrators seeking efficiencies, to researchers' claims for new paradigms that might address the complex challenges of a new century, to a variety of bottom-up, experimental approaches by academics responding to ontological and epistemological shifts or new career opportunities.

Over the last decade too, the dynamic and uncertain conditions of creative practices within a globalized economy have begun to attract serious academic attention. However, much less research has focused on corresponding changes in the institutional environments within which academics now operate. The changing conditions and managerial strategies of higher education have resulted in new divisions of intellectual labour; within which individual academics and students have become increasingly isolated and ever more accountable.

In light of these developments, this paper addresses what educational theorist Ronald Barnett calls "ideologies of calculation" that have come to circumscribe practices within the new university (Barnett 2003:18). These ideological discourses limit how contemporary institutional frameworks can be seen - not only in relation to any academic tradition or professional agenda but to education and intellectual life more generally. Thus, there is a need for debate to be framed within a context of radical change in higher education policy since the 1990s. Three interrelated inquiries are woven through this paper.

First, what are the characteristic qualities of this new institutional field and how (well) are they understood. Second, what effect does this institutional context have on the academic, disciplinary and/or professional identities of people involved? And, third, how do individuals conceive the praxis of teaching

and research *vis a vis* newer institutional ideologies, when they are also embedded in the process and therefore subject to its procedures?

At another level, the program represents an opportunity to develop hypothesis-driven or inquiry-based methodologies for collaboration that might address Ernst Boyer and Lee Mitgang's idealistic and much cited, but less heeded, call for

" a new language driven by the conviction that the standards used to evaluate performance should be organised not so much around blocks of knowledge ... as around modes of thinking: the discovery, integration, application and sharing of knowledge" (Boyer and Mitgang 1996:66)

However, the notable weakness of Boyer and Mitgang's thesis is that it proposes a structure without *agency*; leaving personal agency and the individual meaning-making of situated actors within real institutional contexts relatively unexamined.

Elsewhere, John Robinson proffers two types of interdisciplinary research "temperament" that he suggests are "derived from actual practice". The first is interested in "inter-relationships among disciplines, the intellectual puzzles and questions that lurk at the margins of established knowledge, and ... the intriguing possibility of creating new understandings, drawing from established bodies of disciplinary thought" (Robinson 2008:72). However, even though people may seek to create new insights, the practice itself remains defined and delimited by academic disciplinary norms. By contrast, the second temperament revisits Klein and Newall's (1996) 'issue driven interdisciplinarity' that compels practitioners to navigate the "sometimes uncomfortable borderlands" between the academy and the larger world*.* (Robinson 2008:72).

Robinson's 'temperaments' recall Bourdieu's *habitus*; an analytical tool that attempts to explain how clusters of apparently objective relations that define any disciplinary field come to be adopted by individuals. It describes a "schemata of perception, appreciation and action that result from the institution of the social in the body" (Bourdieu 1998:127).

Bourdieu's original exegesis can be re-construed as fluid networks of objective relations between legitimate but varying positions. These fluctuating, continually forming and reforming contexts constitute what sociologist Andrew Abbott (2005) calls 'ecologies of practice'; characterized by "interactions between sets of agents, sets of locations, and relations between these - neither fully constrained nor fully independent" (Abbott 2005:249). Despite disciplinary claims for control of knowledge bases or occupational boundaries, any learning environment is a complex interactive system occupied by competing actors, subgroups and forces. Indeed, for the program described here, the merging of individuals or groups into a legitimate whole is less important than the coming together, sometimes only briefly, of ideas and agencies in overlapping constellations of knowledge, research practices and ethical affects.

"The appeal of ecology as a conceptual metaphor is its ability to focus our attention on a temporarily finite set of practices, ideas, and interactions without fixing them in place or investing too much critical energy in their stability." (Brooke 2009:42)

Thus it becomes possible to imagine academics and students of, and in, institutions as simultaneously co-creators and creations of an ecological system. This partially explains the relational environment which the Creative Technologies program has created; a dynamic learning system that continually - and

rhetorically - constructs, construes and re-configures itself under the influence of various agencies - individual or collective – that are both internal and external to the institutional environment.

The new program seeks to shift the traditional focus of creative enquiry from the individual (broadly, fine-art model), to a more socialised notion of collaboration. The notion of our studio as a "collaboratory" - an evolving laboratory for collaboration and creativity - also recognizes that such environments can foster complex, dynamic, risky and opportunistic relationships; between situated agents, methodologies, knowledge domains, technological developments, skills and applications.

Such environments are often also characterised by a playfulness that may make it difficult to recognise, articulate or evaluate the resultant experimental propositions as valid educational outcomes. Given the current international interest in both "creativity" and "collaboration" in numerous educational policy documents and graduate profiles, it isappropriate and timely that the program initiates critical engagement with this "play" - not least by challenging institutional praxis.

Conclusions

This paper has attempted to shift attention from the traditional focus on processes or outcomes, to explore how academics themselves might (re-) negotiate their own roles, in relation to others, within a discursive ecology. In this sense, inter- or trans-disciplinary education can be seen as rhetorical practice; capable of being adopted or resisted by academics, students and administrators operating to construct what Bourdieu called a "space of possibilities", that "defines and delimits the universe of both what is thinkable and what is unthinkable" (Bourdieu 1988: 220).

What would seem to be at stake here is the issue of whether institutional agencies are themselves capable of conceiving, engaging, directing or influencing transdisciplinary education at a philosophical or cultural level, and so stimulating new modes of practice for a complex and uncertain world, or whether their role is confined to debates over epistemology, funding, institutional management or marketing. The contribution of this study is to shift attention from institutional discourses of compliance towards a broader field of possibilities for creative *praxis*.

References and Notes:

1. Andrew Abbott, "Linked Ecologies," Sociological Theory, 23/ 3 (2005): 245-274.
2. Ronald Barnett, Beyond All Reason (Open University, 2003)
3. Ernst Boyer and Lee Mitgang, Building Community: A New Future for Education and Practice. (Princeton, Carnegie Foundation, 1996).
4. Pierre Bourdieu, Practical Reason (Cambridge, Polity, 1998)
5. Collin G. Brooke, Lingua Fracta: Toward a Rhetoric of New Media, (Hampton Press, 2009)
6. B. Chandramohan and S. Fallows, Interdisciplinary Learning and Teaching in Higher Education: Theory and Practice (New York, Routledge, 2008).
7. J.T. Klein and Newell, "Advancing interdisciplinary studies," ed. J. Gaff and J. Ratcliff, Handbook of the Undergraduate Curriculum (San Francisco, Jossey-Bass, 1996)
8. John Robinson, "Being undisciplined," Futures 40 (2008):70–86.

PAINTING FURTHER ALONG THE RIVER

James Faure Walker

The impact of 'digital painting' on regular painting is a complicated story. Until the nineties 'computer art' was predominantly abstract and about systems. My painting has always been lyrical. It has moved between electronic and 'physical' forms without much pain. Increasingly these distinctions matter less and less.

no caption

In the 1970's there was a lull in the dispute between abstract and figurative painting. In fact exhibitions of what we would now term 'conceptual' art claimed to go 'beyond' painting. So painters of all kinds bunched together and forget their differences, intent on showing that they were still going strong. There were ideological arguments against painting too, condemning it for just being 'colour art' or 'playing with paint'. The strands of painting that developed through the decade - from free form abstract painting, pattern painting, new image painting, neo-expressionism – tended to be more liberal and baroque than the uptight doctrines of minimal and conceptual art.

This was the period I came of age as a painter. I was also editing the magazine, Artscribe, which came to be the UK's leading (and artist-run) journal of contemporary art. By the eighties, once 'post-modernism' became the obligatory catchall for curators, whether I put a fish, triangle or blob of orange in a painting did not matter that much. It was a free-for-all, it was all 'imagery', it was all equally meaningful or equally meaningless. Yet in my own mind I was not a believer in the relativism of post-modernism. I suppose it was a lingering belief in 'modernism', the idea of art re-inventing itself and moving forward.

Before considering the impact of digital painting it is worth mentioning this pluralist context that persisted throughout the eighties. Put simply, there was little appetite for 'the next big thing' – nobody was putting on exhibitions called 'the new art'. The computer art of the seventies had largely been connected with constructivism. It was mathematical and disciplined, and in my opinion not massively significant as art. It did not look revolutionary.

I came to computer graphics rather late, in the mid eighties, but was overwhelmed (and this was unexpected, in that I associated computer art with a rather sterile and systematic approach) by the freedom it offered in the way of colour, and the speed of composition. I had experimented with an early Canon digital camera in 1990, but did not own one (an Apple QuickTake) till 1994. So I had seven years of playing around with paint programs – the first being Dazzle Draw on the Apple II, then Deluxe Paint on the Amiga – before I could integrate photos into the process. My main problem was coping with the freedom of digital painting, and then returning to the practicalities of regular painting. I still work in both forms, in parallel, though increasingly I think of it all as 'just' painting. The difficulties have never been technical. There are methods for going from 'screen' to canvas, including stencils, printing, projecting, or just remembering. Equally, I often photo 'paint' and work it back into a digitally produced piece, and enjoy the way viewers cannot tell the difference. The difficulties, rather, are the difficulties of painting.

There has also been a general misapprehension. Using digital gadgetry does not of itself make you a revolutionary artist, nor – if you work as a painter – does it take you beyond the borders of the discipline. A blue is blue, whatever the medium. Nor does 'digital' painting have to be logical, geometric, weird, cyber this or cyber that. My own approach has always been somewhat gestural, even expressionist. The wobbly territory between so-called abstract and representational painting stays much the same. Yes, we have the freedom to scan anything and throw it into the mix – and I do this as irresponsibly as anyone else – but sometimes you just get Photoshop soup. The 'regular' painting world is now more alert to the digital world than it was - how could it not be? - but I have yet to see purely 'digital painting' that would blow those old methods away. I prefer to think of myself as enrolled in the big city of painting.

In my presentation I shall show how my preoccupations have remained more or less constant, even when the 'medium' switches between the physical and the electronic. To talk about colour, light, movement, the flow of a line, doesn't seem to be saying anything very much - neither original nor significant. But I hope it is enough just to get a painting to come to life. As to the presence or absence of 'images', to this question of representation and abstraction, I am not too troubled. If it works, I have no problem in introducing a horse, or a trumpet-player. My approach is quite superficial in that respect. On the other hand, I have attempted to make paintings from encounters with wild-life, from the Great Barrier Reef in Australia thirty years ago, to a stag that stared me out in Suffolk, England, this year. I have called the talk 'further along the river' as an allusion to the book I wrote 'Painting the Digital River: How an Artist Learned to Love the Computer' (Prentice Hall, 2006).

DESIGN FOR LIFE

Meredith Walsh

It is argued that design technologies developed for synthetic biology capture a surplus essential to life. [1] However, I suggest that life's emergent capacity is not being controlled by or inappropriate to design. Rather to explore the potential of life for novelty what is required is a new vocabulary of design. A vocabulary that can be drawn from architect and product designer Greg Lynn.
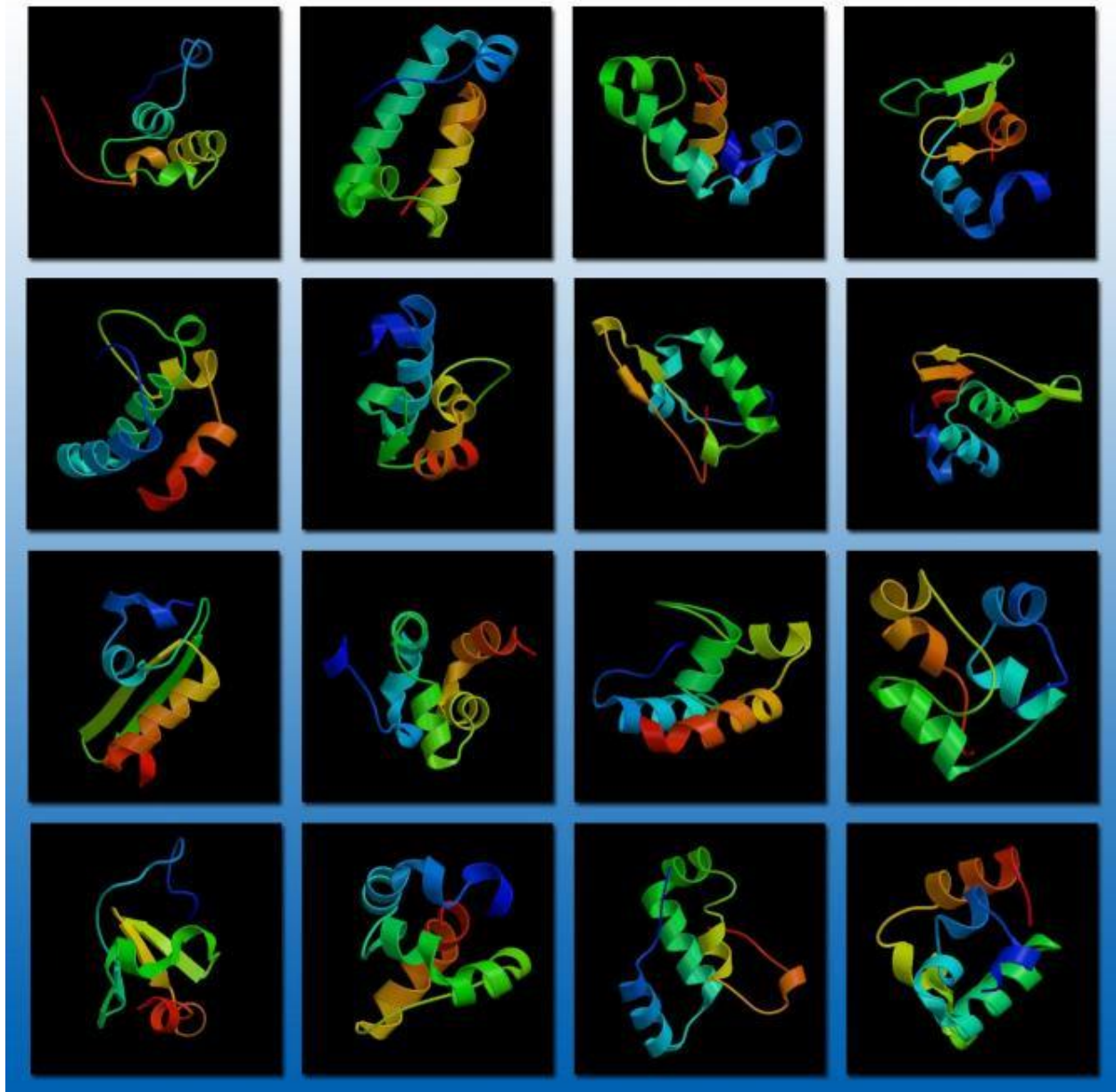
A selection of proteins synthesized by Pier Luigi Luisi Synthetic Biology Laboratory, © Pier Luigi Luisi Synthetic Biology Laboratory.

Introduction

To design novel biological systems synthetic biology has created new software technologies such as *GeneDesigner, Rosetta*, *Foldit*, and molecular graphics programs such as *Chimera* that draw on areas of design including architecture, fashion, media production and electrical engineering to manipulate DNA and produce novel protein structures – the work horses of cellular function. Grouped under the heading of bioengineering, these new design technologies it is argued capture a surplus essential to life within a web of aesthetic and cultural practices aimed at mass producing novel life integral to the digital economy and biocapital. [2] In contrast to design, these arguments continue, novel life emerges chaotically or randomly. Therefore, the design of novel DNA and protein structures either attempts to control [3] or is inappropriate to this capacity. [4] However, I suggest that life's emergent capacity is not being controlled by or inappropriate to design, but the current language of design is limited in its ability to articulate the potential for life. Rather than opposing design and emergence synthetic biology requires is a new vocabulary of design. A vocabulary that can be drawn from architect and product designer Greg Lynn's use of geneticist William Bateson's idea of symmetry breaking.

To discuss developing a new vocabulary of design, because of the fundamental role proteins play in cell function and therefore synthetic biology, in this paper I will focus on the synthesis of novel proteins. As my motivation for exploring a new vocabulary of design is the opposition of design and the chaotic emergence of novel biological systems on the basis that it is an inherent capacity of life, I will look at the Baker lab's software Rosetta –as it is arguably the most common way to design new proteins –and the randomisation of DNA by the Luisi lab in Rome, where I was recently an ANAT (Australian Art and Technology) resident. To articulate the workings of these two techniques, I will first sketch out the very basics of protein coding and function.

Design v. Randomisation

A relatively small segment of the genetic code, genes code for the synthesis of proteins. Through the production of an intermediary code via a process known as transcription, the four bases of DNA, GATC are translated into a sequence of amino acids. Comprised of 20 different discrete amino acid residues as they are called, these sequences are ordered in various lengths as specified by the gene code. After an amino acid sequence is formed, for a protein to work, generally speaking, it must fold into a structure specific to its function. Specified by the order of its amino acids, the structure of proteins plays a functional role in producing different types of cells: particular protein structures produce hair cells, liver cells, skin cells, etc.

Synthetic biologist David Baker describes protein design as the hunt for the amino acid sequence that will fold in such a way to create a protein structure that carries out a desired function. [5] The number of different ways a protein could fold, however, is astronomical. Known as the sequence space, for an amino acid sequence of only fifty residues, the possible combinations of sequences is 1065 (20x20 x20 etc. for 50 residues). Given that a particular sequence codes for the protein's structure, each one of these possible sequences can potentially fold into a different structure. This is a staggeringly large number: For structures that are nanometres in length, the combined weight of possible amino acid sequences for just fifty residues would be equivalent to that of the earth. What's more as most proteins are longer than fifty residues, the number of possible combinations of amino acids is even larger.

As the possible number of amino acid sequences is so staggeringly huge, some means had to be found to reduce the variables needed to be calculated, which would yield a novel protein. To reduce the number of calculations, Baker's protein prediction and design software Rosetta uses banks of known amino acids structures. Instead of using individual residues, Rosetta takes short fragments of about 9 residues from larger structures and variously assembles them into new structures.

When used in its predictive mode to provide the most likely structure into which an amino acid sequence will fold, Rosetta takes a known sequence and assembles nine hundred possible structures, from which it ranks the top ten. For each of these structures, Rosetta then gives the x, y, z, co-ordinates of every atom. Taking these co-ordinates the proteins are visualised as folded three dimensional static structures, using molecular graphics software.

When it is used in design mode to create a novel protein rather than predict the structure of an amino acid sequence, Rosetta uses a reiterative approach. To begin its reiterative approach, the designer inputs an amino acid sequence for which there is no known structure into Rosetta. Deploying its predictive feature, it then ranks the top ten most likely structures for this sequence. After ranking the most likely structure, this amino acid sequence is fed back into Rosetta and the process is repeated. Once again, sourcing fragments of known protein structures Rosetta assembles and ranks the top ten structures. Using this technique, the Baker lab created the novel protein Top 7.

However, despite successfully designing a novel protein using Rosetta, Baker's approach is criticised by both synthetic biologists and its commentators. Criticising the bioengineering style design claimed to characterise synthetic biology, both camps argue that the systematic and various assembly of extant genetic components found in databanks runs counter to the inherently emergent function of life. Commentator on synthetic biology Adrian Mackenzie for example suggests that the design of novel biological systems, using standard parts and assembled components in manner drawn from electrical engineering and other product design typified by drop down menus and drag and drop objects controls life's essential chaotic function. [6] Assembling and rearranging parts in an orderly fashion for an intended functional outcome, according to Mackenzie, by definition controls the chaotic capacity by which novel living systems emerge. From within the laboratory, the Pier Luigi Luisi laboratory similarly argues that bioengineering is unsuited to the emergence of novel life. Writing on the epistemology of life which informs his experimental research, Luisi argues that life did not occur nor changes by design. [7] As with Mackenzie, for Luisi bioengineering design is characterised by a modular means of modifying or producing novel biological systems developed from electrical engineering, which relies on the assembly of extant genetic components or biobricks stored in databanks. And similar to Mackenzie, Luisi argues that variously assembling banked genetic components does not take into account the emergence of life.

Drawing on systems biology and autopoeisis, novel biological functions he argues do not causally derive from the reassembly of single components; they randomly emerge and cannot be causally identified as the sum of their preceding parts. [8] On this basis that novel biological systems *emerge*, he further suggests the attempt to *design* novel living systems is unlikely to have little more than isolated success. Though, Baker has designed a novel protein, and Venter developed Synthia, using a cut and paste logic, the design of novel life he says assumes that when taken out of their systematic context components such as single enzymes and metabolic pathways will retain their specific functionality. [9, 10] Taking a top-down approach, as the lab refers to design, is therefore unlikely to be broadly effective. While the lab acknowledges that there have been some remarkable one-offs, using a bioengineering approach they argue, design has not provided synthetic biology with a roadmap. [11]

Though I empathise with the lab's argument for emergence, by defining the capacity of life as emergent, the Luisi lab's position resonates with the objections to design of Mackenzie and others. While the lab does not overtly argue that the chaotic capacity of life for novelty is being controlled by design, they do argue that design cannot emerge novel proteins because it is intentionally directed at causal outcomes, unaware of life's emergent capacity for novelty. [12] Despite their differences, both Mackenzie and the Luisi lab effectively insist that emergence is an inherent capacity of life.

In keeping with their assertion that design is at odds with life's emergence capacity, the lab has developed a technique to randomise DNA as a way to create novel proteins. Rather than relying on the assemblage of extant components or biobricks to design a protein with a preconceived function, they have developed a means to randomise the order of the four DNA bases GATC, in an attempt to code for amino acid sequences that may fold into novel protein structures. As the possible order of amino acids for even a fifty residue sequence is astronomical, randomising the order of the four DNA bases GATC even a restricted amount of times generates a significantly large number of amino acid sequences. Since not all amino acid sequences will necessarily fold into functional protein structures, the large number of sequences generated constitute a pool (approximately 109) in which to fish for those that may fold, and do so in novel ways. (While the lab has generated a significant number of folded structures, the lab is still in the process of exploring the function of the proteins they have synthesised in comparison to already known proteins. As such, it is not entirely clear whether they have created any which are novel. [13] Given the large number of sequences, to fish for novel amino acid sequences which may fold into functional protein structures requires a means by which to select possible candidates which will structure when inserted and expressed in a living cell. It is not practically possible to test them all. Since it is not possible to test all sequences, the lab must use some form of protein prediction software. Enter Rosetta. Despite their attempt not to use extant components of any sort, the Luisi lab's random technique relies on Rosetta's use of statistically averaged structures assembled from existing protein fragments to predict the likely structure of the amino acid sequences they have generated. While they assert that novel systems emerge randomly, their technique remains reliant on banks of extant components. And their approach snared in the tenets of protein design.

Rather than design either controlling or being an ineffective means to create novel proteins based on life's inherent emergent capacity for novelty, I suggest that the current method of protein design is limited in its ability to experiment with creating novel proteins. Importantly, what I mean by 'limited' differs from any claim about the affectivity of design or otherwise in regard to the inherent capacity of life. In contrast to claiming that design is ineffective on the basis that life is inherently emergent, a limit as I propose it is coupled to the idea of potential. Potential does not inhere in life. Rather, potential is an opportunity for novelty that may occur through the temporal interaction of the components of a system which may themselves change. Though I will detail this idea below, simply put a potential for change is not an inherent capacity of life because it does not pre-exist in life *prior* to the temporal interaction of its components; it occurs *during* the interaction of its components, which may themselves change. Taking into account that the potential for novel life occurs temporally, bioengineering design cannot be argued to either control life or lack efficiency because it does not acknowledge its inherently emergent capacity. Instead a bioengineering approach can be seen to be limited in its capacity to explore life's potential because it does not factor time into design. Static structures assembled out of given components which are statistically ranked have no dynamic temporal dimension, and therefore no opportunity to interactively change.

Rather than eschewing design on the basis of life's inherent capacity for novelty, I suggest a new vocabulary of design is required to experiment with the potential for life to produce novel proteins. A vocabulary that can be fruitfully explored by drawing on the language of architectural and product designer Greg Lynn.

Design for Life

Rather than Darwin geneticist William Bateson is Lynn's hero. Coining the term genetics in 1905, Bateson inspired Lynn's design vocabulary for which he is renowned. [14] Drawing on Bateson, Lynn broke with the static design of organic structures to reconceive architectural design through animated forms. Arguing that static approaches to architecture were limited by structure being the determining force of design, Lynn turned to Bateson's interest in the exception rather than the ideal form. Conceptualised in terms of symmetry breaking, exceptions occur whenever there is change in the symmetry of an organic form to asymmetry. Contrary to the idea that a symmetric form is a source of information about its structure, according to Bateson when organic forms become asymmetrical information is generated and when they return to symmetry it is lost. To apply Bateson's idea of symmetry breaking to architectural and product design, using calculus Lynn developed his vocabulary of animated structural change.

According to Lynn, the calculation of time is possible through the mathematical language of curvature. And calculus is the language of curves. In contrast to static structures and ideal forms, Lynn's interest in calculus is "... the creative structural role of time and force …" [15] A creative role that he marries to Bateson's idea of symmetry breaking to generate a design language of continuous form and exceptions, information and its loss. Using calculus to generate exceptions, Lynn reconceived the architectural idea of a static form that exists in empty space to a manifestation of dynamics forces that are temporally shaped. "Continuous curvature", Lynn says "is the graphical and mathematical model of the imbrication of multiple forces in time." [16] Dimension in Lynn's design vocabulary is not conceived in terms of ideal units and discrete components, rearrangeable in empty space. Instead, the assembly of a large number of components loses its modular quality: Wholes and parts are no longer discrete points, but a continuous stream of relative values inseparable from the creation of their form. [17] Conceived as a current of forces, the subdivision of the components of a form is more complex than in empty space. Instead of a neutral abstract space which is an empty container in which given components can be discretely located according to their x, y, and z co-ordinates, space is an active force of design. Significantly, in terms of the difference between Lynn's vocabulary of design and a classic model of empty space and ideal structures there is no essential structure to the forms that manifest which exist relative to the shapes which occur. There is no deviation from an ideal. Forms occur according to their own logic of differentiation and exchange of which active space is an irreducible part. [18] Occurring according to their logic of differentiation and exchange, symmetry breaking is not necessarily arbitrary or chaotic but is co-extensive with the logic of interactions as they occur. Randomness or chaos is therefore not in simple opposition to a logic of forms.

As proteins are curved structures there is an obvious applicability of Lynn's vocabulary to protein design. However, while there appears to a reflexive fortuitousness in proposing to apply an architectural vocabulary inspired by an early geneticist, I am not interested in Lynn's language of design because it is underpinned by an essential definition of biological life: A definition that will replace the error of others on which the opposition of design and random emergence is based. I am not suggesting any sort of corrective correspondence between Lynn's vocabulary and a definition of life drawn from Bateson. On the

contrary, it is the shift from a language of given components and ideal forms to a language of differentiation and exchange which does not correspond to any pre-existing capacity that I suggest offers the opportunity to develop a language of design articulating the potential for novel proteins to occur, and indeed novel biological systems generally. When emergence is asserted to be a pre-existing capacity it is equated with life itself. Equated with life, both design and the randomisation of DNA are placed in relation to its essential capacity: *the design of life, the randomisation of life (*even as the latter is asserted to correspond to its inherent definition) and their opposition is drawn. Exploring the potential of structures to form during temporal interaction on the other hand, shifts the language of design understood as a manipulation *of* life, to designing *for* life, for the way it may dynamically occur in future.

With Hugh Fisher of the Australian National University, I have begun to explore just such a language of change. Drawing on the structurally creative aspect of time and force we have begun to address the possibility of developing a language of protein design which steps outside of the opposition between design and randomisation on the basis that life is defined through its inherently random capacity for emergence.

While I'm unable to discuss our attempt so far in this context, and I've only offered a sketch of Lynn's work as it might be applied to protein design, seriously entertaining the idea of such a vocabulary I suggest generally offers the opportunity to shift arguments in synthetic biology away from the design *of* life to the design *for* life.

References and Notes:

1. Adrian Mackenzie, "Design in Synthetic Biology," in BioSocieties 5, no. 2 (2010): 192-193
2. Ibid., 195.
3. Ibid., 186-193, 195.
4. Pier Luigi Luisi, "The Synthetic Approach in Biology: Epistemological Notes for Synthetic Biology," in Chemical Synthetic Biology, eds. Pier Luigi Luisi and Christiano Chiarabelli, 352 (Hoboken, NJ: Wiley Scientific, 2011).
5. Baker, David, quoted in Ewen Callaway, "The Shape of Protein Structures to Come," Nature News, November 16, 2007, http://www.nature.com/news/2007/071016/full/449765a.html (accessed November 3 2010).
6. Adrian Mackenzie, "Design in Synthetic Biology," in BioSocieties 5, no. 2 (2010): 187.
7. Pier Luigi Luisi, "The Synthetic Approach in Biology: Epistemological Notes for Synthetic Biology," in Chemical Synthetic Biology, eds. Pier Luigi Luisi and Christiano Chiarabelli, 352 (Hoboken, NJ: Wiley Scientific, 2011).
8. Ibid., 351.
9. Ibid., 352.
10. Christiano Chiarabelli, "Searching for de novo Totally Random Amino Acid Sequences" in Chemical Synthetic Biology, eds. Pier Luigi Luisi and Christiano Chiarabelli, 157 (Hoboken, NJ: Wiley Scientific, 2011).
11. Ibid., 156-157.
12. Pier Luigi Luisi, "The Synthetic Approach in Biology: Epistemological Notes for Synthetic Biology," in Chemical Synthetic Biology, eds. Pier Luigi Luisi and Christiano Chiarabelli, 343, 352 (Hoboken, NJ: Wiley Scientific, 2011).
13. Christiano Chiarabelli, "Searching for de novo Totally Random Amino Acid Sequences" in Chemical Synthetic Biology, eds. Pier Luigi Luisi and Christiano Chiarabelli, 172 (Hoboken, NJ: Wiley Scientific, 2011).
14. Greg Lynn, "Greg Lynn on Calculus in Architecture," TED official Web Site, filmed in 2005, posted in 2009, http://www.ted.com/talks/greg_lynn_on_organic_design.html (accessed June 10 2010).
15. Greg Lynn, Animate Form (New York: Princeton Architectural Press, 1999), 18.
16. Ibid., 23.
17. Ibid.
18. Ibid.

INTEGRATING WEEBLY AND GO DADDY INTO A STREAMING MEDIA AND AUDIO PRODUCTION PORTFOLIO COURSE

Daniel Walzer

This abstract focuses on integrating Weebly and Go Daddy as effective tools for teaching streaming media in an audio production curriculum. By combining these web elements, audio production students are introduced to convergent and integrated broadcast media concepts while building their final portfolio to graduate.

As traditional media outlets converge towards a fully integrated digital platform on the internet, the need to address these changes in an audio production curriculum is essential. Capitalizing on the myriad of web-based portals to simulate broadcast environments is both cost effective and an excellent tool for building a comprehensive portfolio as students near graduation from the academy. By creating class projects that teach the essential aspects of simple web design, video blogging, podcasting and audio production, students are exposed to a well-rounded set of course competencies that foster creative thinking, entrepreneurship, and effective promotion. By incorporating this comprehensive approach, students are better served to navigate the demands of a changing media landscape while learning to creatively express themselves using simple web-based portals.

According to Britt and Eppes (2003), audio production curricula have grown considerably over the past decade in large part due to the powerful marketing and interconnectedness between popular culture, media, and electronics technology (1). Students in a typical baccalaureate audio program are exposed to sound for picture, MIDI production, electronics, video editing, mixing, music production, live sound, sound for animation, and multimedia web production. As technology has become more integrated with the internet, aspiring audio professionals have the ability to create and upload sonic content almost instantaneously.

According to noted American author and educator Mark Prensky (2005), 21st century audio production majors are fully immersed in a "digital native" culture (2). Prensky defines digital natives as "students [who are] native speakers of technology, fluent in the digital language of computers, video games and the internet". (Prensky 2005, 2)

Streaming media and web-based production courses are specifically designed to showcase student work and facilitate creative multimedia expression in a cost effective fashion while observing the changing trends in Web 2.0. According to Brown and Adler (2008), the rapidly changing influence of technology has infiltrated the educational marketplace and students are now poised to powerfully influence multimedia expression on a global scale in an extremely cost-effective way (18).

Generally a course of this type would showcase student demo reels and occur in their third or fourth year of undergraduate study. At this point of their degree matrix, audio production majors should have taken foundational courses in digital audio, video editing, computer applications and studio/live recording classes. These varied courses would also serve as appropriate prerequisites for the convergent

streaming media class.   A streaming portfolio course could also serve as a perfect capstone for the internship and/or graduation.

An audio-focused streaming multimedia course is set up in two distinct ways. The first is a lecture-based format in which students are exposed to the basic theoretical principles of streaming media. During this portion of the class, students learn about web- delivery formats, audio and video-specific codecs, Web 2.0 principles, and the general history of media production for the web. Students learn about the aspects of effective web promotion through the analysis of metadata, search engine optimization and effective keywords. Additionally the students learn about the evolution of social networks and their role in the media marketplace, and a history of media players as well.

The second portion of the course focuses on laboratory work, where students produce and refine various types of media content. In considering the space and web design limitations, a web-based portal serves as an effective host for student websites and audio/media portfolios. The comprehensive "reel" and corresponding website are built over the course of the term in stepwise fashion.

Weebly is a website with dedicated web templates that allow students to customize the layout of their site with a number of multimedia options. Some of these options include embedded video, music players, and slide shows. The students are given short weekly video assignments in which they review a product, provide instruction about some facet of audio production, or present a video diary. Other students chose to produce sonic poems with still photography and original compositions. Once the students produce a simple two-minute video, they'll transfer the raw footage into Final Cut Pro and proceed to edit the projects as assigned.

The web videos are then exported using Quick Time conversion into a streaming format that was small enough to fit on a website quite easily. Over the course of the term, each student will produce six to eight finished videos, complete with edits, fades, and the appropriate slate. Each student is required to tape a "video greeting" which will appear on the front page of their website.

As a part of each lab time, the students critique each video and are encouraged to develop a mini-series based on these short video exercises. The goal is to foster a creative mindset for producing short-form content. As a result of this, by the end of the quarter each student's web videos increase in depth, production value and overall content. This portion of the project also familiarizes them with multiple video compression formats and multiple delivery streams. Some students chose to create their own YouTube channel as well. By cross-promoting their YouTube channel, they drove traffic to their content in a quick fashion. This is a great benefit to lab time as Weebly also has a multimedia feature that allows web site builders to link to other media outlets as well.

After the students build some momentum in the video realm, they were encouraged to take pictures with a digital camera and create a Flickr account as well. Since Weebly allows for a Flickr slide show, the students already have two or three significant elements for content on their website. A portion of each week's lab time is dedicated to exploring the Weebly templates and each student receives instruction in how to drag and drop the elements into their website.

Weebly has a feature that allows for configuration of a domain name from an external source. In this case, the students are presented with two options. Most of the students in the course upgrade to the Weebly Pro account for a nominal fee. This allows them to further customize the html to their specific

needs. By doing so, they can embed their current resume, contact information and additional portfolio pieces.

Go Daddy is one of the most visible domain hosts on the internet. Students in the class researched the available domain names and then encouraged to purchase their domain name through this site. By doing so, they could register the name and then reconfigure it with Weebly's site. In total, the cost is under thirty dollars for the Weebly Pro and Go Daddy registration for six months.

Once the students purchase their domain name, the final step of the process involves redirecting their Go Daddy domain name with Weebly's site. In the FAQ section of Weebly, there is an entire tutorial in how to configure a customized domain name with their server. The students redirect their Weebly default address to the customized domain name. Within a few minutes their individual domain names appear with the Weebly website they have just built from scratch.

Students started including additional audio and post-production projects that serve as appropriate demonstration recordings. Some choose to link these videos to their YouTube channels, and others take advantage of the Weebly music and video players. In all, the students are required to submit three finished web videos, three finished audio mixes, an updated resume and contact information, and their other multimedia projects on the Weebly site. The final element includes their personalized video greeting. This video greeting helps personalize the site and is a memorable alternative to a standardized cut-and-paste cover letter that is written. Additionally these elements take advantage of the simple multimedia tools that are at the consumer's disposal.

By the end of the quarter each student has an individually designed web page that is truly reflective of their personality and interests. In the beginning of the term, the students often express apprehension in trying to build a website without much experience. This alternative has been most effective in showing them how to be empowered in the Web 2.0 era. The project gives them a tangible item they can continue to revise after the course is finished. With a simple click of a mouse, potential employers can peruse the student's demo reel and portfolio, thus increasing their chances of standing out in the job market, all while giving the student a viable avenue to display their originality and creativity.

By configuring Weebly and Go Daddy into a comprehensive semester or quarter-long project, audio production students test out the web domain without serious complications. Secondly they learn vital web-based design skills while fostering an entrepreneurial mindset through search engine optimization and metadata manipulation.

In this digital era, audio production students need every advantage they can in order to foster a creative multimedia presence on the web. As the paradigm changes with media convergence, this project has created a synergy between technology, entrepreneurship and the stated learning objectives of the course. This project has also been a cost-effective solution to limited server space. And most importantly, it has reinforced the importance of well-roundedness as our audio production majors enter the job market after graduation.

References and Notes:

Britt, Timothy, and Tom Eppes. "Audio Technology as a Gateway to Engineering." Proceedings of the 2003 American Society for Engineering Education Annual Conference and Exposition Session 3448 (2003): 1-6.

Brown, John Seely, and Richard P. Adler. "Minds on Fire: Open Education, the Long Tail, and Learning 2.0." EDUCAUSE Review January/February (2008): 17-32.

Prensky, Marc. "Listen to the Natives." Educational Leadership 63 (2005): 8-13.

References and Notes:

A LAYERED PROCESS: LYRICAL IMPROVISATION

Beth Warshafsky

As an artist bridging influences, practices and histories, I am interested in the expressive development of form through process and in poetics in the broadest sense of the word.
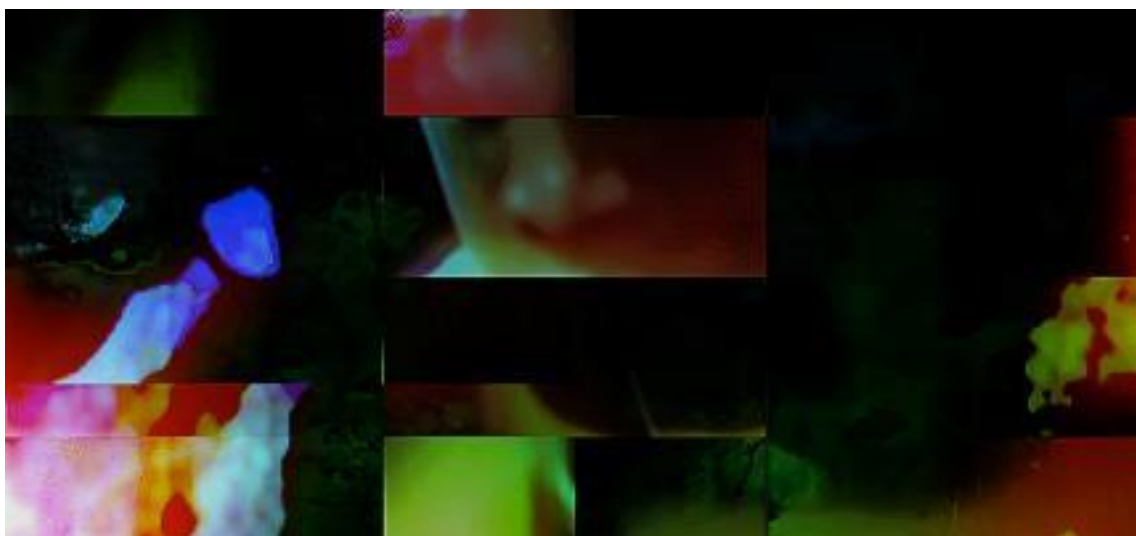
Fig 1. Still from Behaviors 2010, Video Projection for live performance with Gerry Hemingway at Follow the Sound, a jazz and new music festival, deSingel Internaitonal Kuntscampus, Antwerp, Belgium.

A Layered Process: Lyrical Improvisation

As a young poet turned painter and printmaker, I was always interested in how content shifted as it moved between mediums. While I was enamored with painting and the formal innovations which pro-pelled modernism, I was also concerned that some of the things I wanted to express did not lend them-selves to paint. Digital media was not yet on my horizon, but I was surrounded by non-narrative film-makers who were also grappling with the formal properties of their medium. While I never made films myself, by the time I started to work on the computer, I was already looking for something.

Right after graduate school in the mid 1980s, I entered the emerging world of broadcast and cable graphics and animation and immediately started experimenting with this new medium. It was natural for me to transmute some strong painterly and expressionistic qualities to this canvas. The directness as well as the mutability of the computer made an immediate hit with me, while the ability to work both with multiple images and time became my focus.

As a tool, the computer makes it easy for an artist to work with the same material in different contexts. For me this means moving between stillness and motion, between abstraction and representation, be-tween image and sound, incorporating dance, text and data driven "materiality into my work. The fluid overlap between these sources and processes allows my work to lean in different directions, depending on what it is I am trying to express.

Working in multiple mediums also expands the possibilities for metaphor, not only between sound and image, abstract and representational form, but through new expressions of materiality. The word "brush" now includes the whole body through both photographic sources or data capture. These practices are extensions of basic expressive tendencies.

Because we are inherently multi-sensorial, I experience a strong feeling of materiality and an engagement in my body--a certain energy-- even when I'm working with multiple layers in a complex computer interface. Seeing it means feeling it, whether the tool is code or paint. This orientation toward process and through the body informs so much of what I do.

This is furthered in my collaboration with the musician and composer Gerry Hemingway. We have worked together for almost 20 years and have established a way to dialogue about sound and image which shapes the content of our pieces. Often we work back and forth, moving between multiple layers of sound and image to create a compositional whole. This allows for overlapping correspondences and associations in content.

I am going to be discussing two directions in our latest work -- visual music and lyrical form.

"The Visiting Tank" is a 13-minute piece Gerry wrote as part of a program of Chamber Works, originally performed and recorded for Tzadik Records in 1999. In 2010 I created a visual score, which was projected behind a string quartet at the Kleintheater in Luzern, in a show named "Step Across the Border." This evolved into a single channel video, an emotive tone poem. It was inspired by the events in the former Yugoslavia, which had left it's legacy of destruction and devastated so many lives. Gerry composed the music in a kind of narrative format, imagining, in sound, a story about the war from the perspective of the children who survived it.

This piece was a departure from our previous collaborations in that I composed a visual score after the music was written. While it is not necessary for the audience to know these details in order to appreciate the work, both Gerry and I incorporated elements from the countries involved in this conflict. Gerry used parts of the Bosnian and Serbian national anthem in a violin section, and I trolled the Internet for video references. My sources (from UTube) included images of nature and war gleaned from home movies and news. This was the first time I used material from the internet, some of it already poignant, and I feel it's important to acknowledge that these experiences which moved me so, were not my own.

Our next piece, Behaviors, which is a work in progress, focuses on visual music for live performance. The image score was projected behind Gerry's performance last year at "Follow the Sound," a jazz and new music festival at the deSingel International Kuntscampus in Antwerp, and this year at Guilph Jazz Festival in Canada. In this incarnation, we consider the projection as a layer which is positioned between the live music and pre-recorded sound textures which Gerry triggers during the performance. Musical transitions, from continuous transformation to fast changing juxtaposition, form the structure of the sound and image.

While I sometimes curse the limitation of the computer environment, I love the fact that it provides a space for me to try to forge these kinds of connections. Often I feel I am working on a platform as an alchemist, shifting source materials into new amalgamations.

I am interested in the expressive development of form through process and in poetics in the broadest sense of the word. As an artist bridging influences, practices, and history. I believe that it is as important for me to continue to engage the "painter's eye" as it is to adapt new kinds strategies into my work. I think this creates a dynamic dialogue with the past, allowing for new and even unexpected inspiration. Following these threads wherever they lead is not only "the state of art" today, but it is part of what makes contemporary art practice so interesting and exciting.

CLASSICAL HOLLYWOOD AS AN EPISTEMOLOGICAL NETWORK

Birk Weiberg

The paper discusses optical effect techniques of the 1930s and early sound film as intrinsic practices of commercial cinema. The approach only to be sketched here is to discuss structures, machines, people, and institutions as tantamount agents of an epistemological network where education turns into means of development and control.

Perhaps no other medium has been described, analyzed, and understood in relation to other media as much as film has been. Theatre, photography, and magic provided a framework for understanding the intermediality of film as an exchange between people, objects, and techniques. In what follows I shall leave aside the peculiarities of these entities, and shall instead regard them as equivalent containers of knowledge – a reduction that resembles Bruno Latour's concept of an ontological symmetry of human and non-human actors. [1]

The attempt to describe Hollywood around 1930 as an epistemological network immediately raises the questions of how much external knowledge was necessary and how much was digestible to support the development of a relatively young medium like film at that time? I shall claim that Hollywood progressively excluded external 'actors' and therefore was forced to establish its own structures in order to compensate this loss or integrate knowledge on its own terms.

The fact that most people working in the industry did not have higher or specialized education proved to be favorable for achieving independence. Autonomy here means self-referentiality as opposed to intermediality.

1 Hollywood & Education

In 1927, banker Joseph P. Kennedy, who had recently made his first ventures into the movie business, organized a lecture series at Harvard Business School. It consisted of speeches by Hollywood representatives – most of them producers or executives. Kennedy's interest was to show to the upcoming economic East Coast elite that film was a legitimate and rational business. Furthermore, he used the course to consolidate his industry network. Kennedy later published the lectures under the title *The Story of the Films* [2] and sent myriad copies to leading figures in the film business.

An invitation to Harvard was considered prestigious. Therefore, even the seriously ill president of MGM, Marcus Loew, accepted. Deeply impressed by standing in front of highly educated young men he started his speech as follows: "I cannot begin to tell you how it impresses me, coming to a great college such as this to deliver a lecture, when I have never even seen the inside of one before." [3] The notion of Hollywood as a place of "widespread illiteracy" [4] was cultivated inside and outside the system. The two seminal descriptions of 'the movie colony' by Leo Rosten (1941) and Hortense Powdermaker (1950) remain internally inconsistent about the educational level of their objects of study, both perpetuating and discounting the cliché. "The fallacy of our stereotypes about Hollywood is strikingly illustrated by the

fact that whereas uneducated captains of industry are praised as 'self-made men,' uneducated movie executives are dismissed as 'illiterates.'" [5] But even in its delusiveness, the notion of illiterateness was constituent for both the dynamic and the self-image of the film industry. "Since many of the fortunes are made by men with little training or special ability, the idea that they can be made by anyone persists." [6]

Whether the level of general education among Hollywoodians was below or above that of other social groups, initially there was no chance to gain expertise through formal education. Just as the lecture series at Harvard remained a singular case, the 1920s and 1930s did not see film programs at American universities or established art schools – with the exception of the University of Southern California (USC). There were a variety of offers by private technical schools whose main aim was not to educate but to make profit, exploiting dreams of film careers in acting, script writing, cinematography, or film projection.

Despite the awareness that Hollywood had its own needs for education, universities were first of all seen as a market and not as a source of knowledge. With the introduction of sound in the late 1920s, the option to produce educational films and distribute them for teaching and learning purposes seemed reasonable. Films with lectures were not only cheap to produce but at the same time could sanitize the image of the film industry. The entry of film as a teaching aid also paved the way for teaching film. But universities initially showed a genuine reluctance toward commercial film production, and confined themselves to courses for amateur filmmakers.

With World War II, the focus shifted from educational films to training films that conveyed technical rather than propositional knowledge. The U. S. military was confronted with huge amounts of green recruits who had to learn how to fight. Know-how here was more important than know-what or know-why. The thousands of films that emerged within a few years – with a few exceptions – were not produced in Hollywood but by newly established or expanded military institutions like the U. S. Navy's Photographic Science Laboratory in Anacostia, Washington, D. C.

The military qualified not only soldiers but also film professionals as part of its communication and reconnaissance tasks. They were the first filmmakers who learned their craft outside the film industry. When the war was over, movies seemed to be a legitimate career option for many of them. The University of California Los Angeles (UCLA) only in 1947 started its first practical film courses and thus provided knowledge independently from the industry.

The dissolution of the studio system after the war was hence not only a result of the triumph of television and antitrust legislation. The shift in epistemological structures as it was caused by the education within the military and subsequently in universities had a similar effect as the divestiture of the economic monopoly.

2 Film Knowledge

How was the acquisition and production of knowledge organized until a formal education of film production existed? We can roughly distinguish here between two phases. During the first phase, any kind of epistemological network, including Hollywood, tries to constitute itself. Therefore, at first Hollywood gathered knowledge (again in form of information, people, and machines) from other networks, i. e.,

photography, theatre, fine arts, and magic. When in the 1920s the network had reached a significant degree of coherence, it tried to translate stability into autonomy, and therefore tended to reject external knowledge. This included not only techniques of production but also tasks that might be considered external, such as censorship, which it effectively internalized through the notorious Hays Office.

Hollywood, it seems, aimed at a greater degree of independence than other industries. "The stimulus of contact with those from other fields of endeavor, which is so accessible in most big cities, is lacking in Hollywood. For the most part, people work, eat, talk and play only with others who are likewise engaged in making movies." [7]

Besides the studios, unions, and guilds, the Californian film industry created institutions whose main aims had an epistemological but non-scientific character. Three such institutions that shaped knowledge in Hollywood are the Society of Motion Picture Engineers (SMPE, today SMPTE, founded 1916), the American Society of Cinematographers (ASC, founded 1919), and the Academy of Motion Picture Arts and Sciences (AMPAS, founded 1927). SMPE organized conventions and published a journal with the aim of technical advancement and standardization. Though these are important tasks, SMPE lacks traits that cannot be found in other industries.

With its emblematic motto 'Loyalty, Progress, Artistry,' the ASC is a rather specific organization that offers membership by invitation only to cinematographers and visual effects artists. Its primary aim is to create an exchange of information among its members which at the same time informs a wider public about the state of the art. From the outset, the ASC published its own magazine containing reports on current productions and interviews with its members. Later the magazine was supplemented by a yearly updated handbook with various information a cinematographer might need while working on a film set. Both publications display the society's ambivalent aims in collecting and distributing knowledge (on techniques and the role of the cinematographers alike) and in building an elite.

AMPAS until today is best known for its annual awards celebration. But the academy's research and educational purposes were at least that influential. Its research council by the end of the 1930s consisted of 36 technical committees. While the ASC limited itself to camera issues, AMPAS could deal with all kinds of questions.

The greatest change cinema saw after its initial establishment was the introduction of sound in the late 1920s. As David Bordwell has described, the production of sound films was not only a technological but also a structural and financial challenge. For shooting a silent film on location, it might be enough if a cameraman brought along his own apparatus. Talkies asked for specific sound stages, built up of sound recording devices and multiple blimped cameras mounted on dollies or cranes. [8]

With increasing expenditures, the studios' small machine shops turned into in-house research departments. Cinematographers and sound engineers tried to compensate for the shortcomings of the equipment from outside manufacturers by improving details or developing their own devices. These inventions – such as the mike boom – were later handed over to manufacturers for mass-production. This way the whole movie industry could profit from them. Industry institutions took on a crucial role in this process. Innovations were often discussed at conventions and later presented in trade journals. In this way, innovators received both credit and appreciation for their work while seeing it advertised at the same time. [9]

This structure was helpful in solving conflicts that overshadowed sound innovation as a whole. Sound technique was developed outside of Hollywood by the telephone and radio industry. A first step toward bringing cinema and sound together came with a variety of contracts, acquisitions, and mergers resulting in structures like RKO Radio Pictures, controlled by the Radio Corporation of America (RCA). One reason why the economic integration did not entail an integrated practice was that sound engineers had quite different notions of what it means to record sound, as James Lastra has shown in his analysis of early sound film production. [10]

As a result of newly arising conflicts, the studios started to retrain their workers. AMPAS in cooperation with the University of Southern California (USC) organized a course program which about 900 employees passed through within two years. "One of the chief merits of the program as far as academy executive Lester Cowan was concerned was the opportunity to train current studio employees to become soundmen instead of importing the latter from other industries." [11] This policy accords with Bordwell's observation that the style of Hollywood cinema remained surprisingly stable while sound recording and mixing practice was developed with strict image-sound analogy. [12]

In addition, we can assert that from an epistemological viewpoint the introduction of sound amounted to a major turnover, as it consummated the electrification of film production. Silent film was at its core an opto-mechanical operation that required little theoretical knowledge. Sound technology contained elements that no longer could be seen or even touched, and which therefore required a sublimation of the production process. This passage from technical knowledge to propositional knowledge – from knowing how to knowing that – meant an intellectual challenge to Hollywood that slowed the transition.

3 Optical Effects

The development of optical effects received less attention than that of sound technique. One reason might be that due to the smaller market for corresponding devices, it was difficult to activate larger networks. While sound knowledge circulated between studio technicians, industry associations, and external manufacturers, optical effects during the 1930s remained a topic for the studios' trick departments. Bordwell claims similarities between the post-production phases of image and sound, attributing the fact of consistent terminology ('fades,' 'dissolves') to the equalization of both domains. [13] Besides, we can assume that through the necessity of sound mixing, the post-production of films received increasing attention in general. Likewise, optical post-production could profit from the controlled environment of sound stages.

Two techniques that reached maturity in the 1930s are rear projection and optical printing. One precondition for the regular application of both practices was the increased quality of film stock, which allowed additional generations in the printing process. Compositing, i. e., the consolidation of various image layers into one coherent composition, was by then achieved through techniques adopted from theatre and photography. These included painted sets, miniatures, glass paintings, and double exposure. Though these techniques – especially glass shots – produced satisfactory results they amounted to constraints in shooting. One regular assignment was to complete a building of whose first floor was the only storey that was actually built; additional stories were painted on a glass plate in front of the camera. Such painting had to be done on the set in order to have a fitting perspective and shading. The industry had an interest in postponing these parts of the job to post-production phase for reasons of flexibility and additional creative options. There are two central figures who advanced the two techniques that were in need here. Farciot Edouart, Head of Transparency Department at Paramount Studio, worked on rear

projection while Linwood Dunn of RKO Radio Pictures refined optical printing. Born only ten years apart, Edouart and Dunn signify a shift from imported to acquired knowledge, since the former could draw on a family heritage of photographic craft.

Before Dunn started his career at RKO, he worked his way up as a cameraman without any formal education. Remembering his first days in optical effects, he said, "I learned by doing. […] I knew really very little. I'd done a lot of trick work in the camera in the silent days – composites, mattes, split screens, things we all did. The first optical printer I saw there was nothing but a lathe bed with a Mitchell camera stuck on it, facing a projector." [14]

Neither Dunn nor the apparatus were literally 'informed' in a Flusserian way. As there was no regular way of learning visual effects, there was no long-term practice of developing the machines for it. Due to a lack of research budget in film production, studio technicians used current productions to develop their infrastructure. It remains for further research to determine if this dependence on day-to-day production substantially influenced optical printing and other techniques, or if it only deferred developments.

That optical effects were an important but not yet essential part of film production becomes clear when looking at how Dunn had to promote his activities. Since the early 1930s, he was active in SMPE, ASC, and several other institutions. He lectured on optical effects at conventions and published articles in trade journals. In one of them, he not only lists 13 different studio departments that profit from the "Optical Printer Handy Andy" [15] but also describes how a virtual Landscape Department might benefit from his apparatus as well.

Dunn's optical printer at RKO was of course not the only one of its kind in Hollywood. Most studios had similar devices, but all of them were unique. This singularity had the effect of embedding the features and procedures of effects production. Technical knowledge was produced and circulated as it had been in pre-industrial crafts or artists' studios. In order to keep effects-knowledge available, it needed to be packaged in a distributable form – a process which the history of science calls 'blackboxing.' "The word *black box* is used by cyberneticians whenever a piece of machinery or a set of commands is too complex. In its place they draw a little box about which they need to know nothing but its input and output." [16]

Just as a black box itself is a stable object, it helps the building of such a device to have a steady environment. Though the studio system as a whole can be described as stable, this does not apply to the position of optical effects, as Dunn's efforts to strengthen his position have shown us. The network that was needed to finish his optical printer was provided only when the USA entered World War II and the military upgraded its media infrastructure. The aforementioned Photographic Science Laboratory was built in 1942 and 1943. It was supposed to provide the Navy with all still and motion picture services required, i. e., aerial reconnaissance and the production of films for training and publicity. The Eastman Kodak Company was assigned to plan and equip the laboratory, but had to learn that the optical printer they needed was not "a commercial 'shelf item' product." [17] As a result, a network was established that would produce the first apparatus of its kind that was patented and later could be ordered as such. The inner network consisted of Linwood Dunn at RKO, his studio assistant Cecil Love, who was serving at the Navy laboratory, and the Acme Tool and Manufacturing Company, a machine shop in Burbank that entered the movie business when modifying animation stands for Walt Disney.

Having been built with both external support and internal knowledge, the Acme-Dunn Optical Printer stands as a contradictory object: from an ontological viewpoint, it marks an idiosyncratic break or watershed, when film shook off the old allegation of merely reproducing reality and took on the status of self-referentiality, by filming film and thereby opening up the potential of using copying as a creative process. At the same time, it encapsulated knowledge of the studio system and helped to transmit the very same structure forward into the post-classical era. This device transcended some of the tasks for which it had originally served, and accelerated the medium's advance.

References and Notes:

1. B. Latour, "On Actor-Network Theory: A Few Clarifications," in Soziale Welt47, no. 4 (1996).
2. J. P. Kennedy, ed., The Story of the Films (Chicago: A. W. Shaw, 1927).
3. Quoted in B. Lasky, RKO: The Biggest Little Major of Them All (Santa Monica: Prentice Hall Trade, 1989), 19.
4. L. C. Rosten, Hollywood: The Movie Colony, The Movie Makers (New York: Harcourt, Brace and Company, 1941), 58.
5. Ibid., 6.
6. H. Powdermaker, Hollywood, the Dream Factory (Boston: Little, Brown and Co., 1950), 24.
7. Ibid., 19.
8. D. Bordwell, "The Introduction of Sound," in The Classical Hollywood Cinema: Film Style & Mode of Production to 1960, eds. D. Bordwell, J. Staiger and K. Thompson, 298 (New York: Columbia University Press, 1985).
9. Ibid., 299.
10. J. Lastra, "Standards and Practices: Aesthetic Norm and Technological Innovation in the American Cinema," in The Studio System, ed. J. Staiger, 206ff (New Brunswick, NJ: Rutgers University Press, 1994).
11. Ibid., 214.
12. D. Bordwell, "The Introduction of Sound," in The Classical Hollywood Cinema: Film Style & Mode of Production to 1960, eds. D. Bordwell, J. Staiger and K. Thompson, 301ff (New York: Columbia University Press, 1985).
13. Ibid., 303.
14. Quoted in G. Turner, "Linwood G. Dunn, ASC," in AC 66, no. 12 (1985): 38.
15. L. G. Dunn, "Optical Printer Handy Andy," International Photographer 10, no. 5 (1938).
16. B. Latour, Science in Action (Cambridge, MA: Harvard University Press, 1987), 2f.
17. L. G. Dunn, "Historic Facts about the Acme-Dunn Optical Printer," AC 62, no. 5 (1981).

ENCOUNTERING THE BODY IN ART, ONLINE: VAINS (VISUAL ART INTERROGATION AND NAVIGATION SYSTEM) THE ABJECTION APPLICATION AND THE NEURAL ART NAVIGATION TOOL

Lee Weinberg & Eleanor Dare

VAINS is a curatorial art platform, focusing on repository, search and content recommendation tools adjusted to art content online. It is dedicated to repositioning the body in HCI and deploying thr embodied and situated nature of human users as core resources. curatorial methodologies and ways in which digital art is reshaping curatorial practice are discussed. Experimentation with Abjection Application and Neural Art Navigation tool described
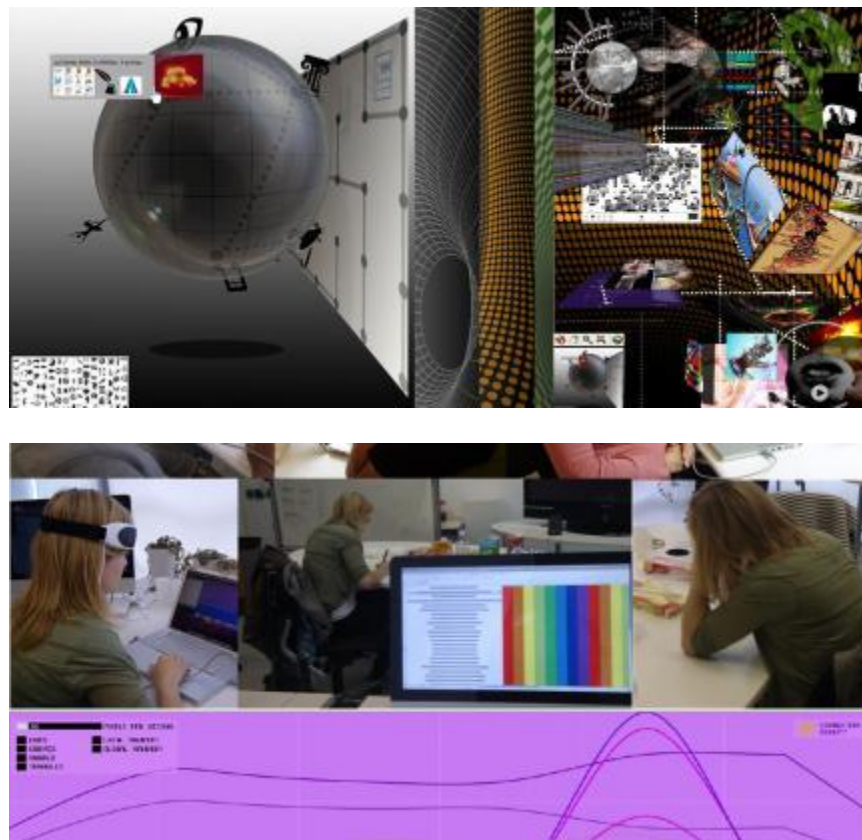
Project Outline

VAINS is an interdisciplinary work in progress. It aims to be an interactive website which offers repository, search and content recommendation tools tailored to viewing digital art in an online environment. The website is composed of different function areas: an archive that can be accessed through cre-

ative search tools; curated spaces, corresponding with the idea of exhibition halls; a research / education centre and a social network. Each of these areas would like to offer users different services, resonating the main principles of the ICOM Code of Ethics for Museums[1]. VAINS Archive draws upon the database of the Computer Fine Arts Collection, courtesy of artist and collector Doron Golan[2], but also aspires to expand its database dynamically by encouraging user generated content, combined with curatorial initiatives.

During the past 18 months we have been developing some of the VAINS tools, placing special emphasis on experimenting with search engines. This paper will outline two of the latest tools created for VAINS: "The Abjection Application" and the "Neural Art Navigation Tool", while positioning these within the context of our methodology.

Background and Methodologies

Artistic practice is becoming increasingly embedded with digital media such as mobile devices and the Internet. This embedding is complex as the technology is both a medium and a dynamic agent in the structure, dissemination and reception of artworks. As such these artistic practices introduce new challenges to curatorial practice which have already been acknowledged by prominent figures in digital media.[3] These writers address a lack in suitable and innovative means for filtering and navigating online art content while referring to the fragmentation and anachronism of many online art contexts. In practice, online art remains, generally speaking, inaccessible to the wide public.

 Accessibility in our view is both the ability to reach content, and the ability to offer tools for a flexible understanding of the content retrieved. In engaging with art works, accessibility might also mean supporting or enhancing an "Aesthetic Experience" [4].

Traditional curatorial practice uses established means such as exhibitions in order to create a context that highlights a possible narrative for interpretation. Viewers, relatively trained in reading exhibitions, intuitively understand "context" on the linear, physical level they offer. These display and classification mechanisms are based on a relative stability of accepted hierarchies between viewers and object-based art works.

Implicit in Western thinking[5] about the image is its role in preserving and encapsulating the past. In Computer Fine Art, programmes, which present themselves as images, actively record, accumulate data, and change according to the viewer's interaction with them. The presented image therefore becomes a platform for a relationship – blurring the safe boundaries between viewer and the image - subject and object. In this sense it disrupts orthodox hierarchies between viewers and artworks. Such artworks, therefore, naturally question the curatorial agency and its approach to representing and preserving art works which are centred on process. The theoretical contour which is usually formed by traditional curatorial means is blurred.

To cope with this, and reconstruct the familiar experience, we found that online interfaces fall into two main categories, either they adopt the familiar economics of "transparent" [6] text-based design[7], or they imitate and re-produce the experience of the art encounter offline[8].

We are interested in asking what an art encounter might mean in a fluid, online environment and how the context within which, and with which, these art works are created, can be brought to the viewer. VAINS would like to offer a metaphorical architecture, where walls are in essence, the programmes that lie beneath the interface, that filter through which content is retrieved. Curatorial practice in this context is not about the selection and classification of artworks, rather it is about exposing the means through which those are selected, and the filters with which classification and categorization are performed.

***

Central to enhancing a meaningful art encounter is the relation to sensual and bodily experiences. In this sense, our methodology has been supported by close readings of enactivist and situated theories of cognition, in particular readings of Alva Noë[9], Maturana and Varela[10] and Lucy Suchman[11].

These writers validate the proposition that human beings are entangled corporeally with their technologies and with complex, relational and temporally bound systems of agency. Although many of online art works are commenting on tensions between the absence and presence of the body in digital or "virtual" worlds, curatorial platforms online seem to neglect (theoretically and technically) questions of bodily or sensual experience in the encounter with art works online. Hence, a core methodological commitment embedded in this project is the confrontation or re-framing of the body in the experience of viewing art online. This is supported by an examination and challenge to the *a priori* separation that is assumed between computers, humans and the ready-made separations that are projected between subjects and objects (including viewers and artworks).

To clarify the relationship of VAINS to these ideas we would like to frame them within a historical context in which computation has been dominated by top-down, disembodied and propositionally based structures. Enactvism offered a radical break from this construction, emphasizing the way that organisms and human minds interact with their environments. The methodologies represented by enactivism and situated cognition offer the possibility of constructing an alternative form of digitally curated space, one that deploys embodied subjectivity and situatedness as valid and valuable resources in the generation of new creative insights in the field of online arts.

This reframing is an opportunity to integrate the body into new epistemologies and methodological approaches. As Grosz[12] states, eschewing disembodied, computational models of cognition represents an opportunity to '*displace the centrality of the mind, the psyche, interior or consciousness (and even the unconscious) in conceptions of the subject through a reconfiguration of the body'*. But, in reconfiguring the body we might also seize an opportunity to reconfigure the inter-subjective and technological boundaries between bodies and computers; viewers and images.

In reintroducing the body in art encounter online, we found that negotiating the centrality of text and language in designing online interface might go beyond breaking the façade of the historical narrative embedded in online interface design. Recent Neurological research into attention divide, suggests, as Claudia Roda[13] explains in her comprehensive introduction to this subject, that: "*the processing codes dimension predicts that analogue/spatial processes use a different set of resources that categorical/symbolic (e.g linguistic) processes.*" Therefore in creating an immersive visual experience, we are interested in experimenting with platforms that avoid the use of language based navigation.

We would also suggest that a key obstacle in building a flexible context to art works is the predictability, which is currently embedded in the way browsers and search engines are programmed. Keywords are not only filters used by the programme to retrieve the content desired, they are also the filters through which the viewer is interpreting and builds a relation to the content retrieved. It therefore becomes meaningful to avoid predictive means of retrieving content, so that boundaries of interpretation could be stretched beyond the limitations of these.

The *Abjection* Application

One of the first tools we have offered VAINS visitors is a mobile application called *Abjection*. The application encourages users to investigate the bodily traces they have left within their digital equipment while viewing artworks. The identification of such visceral traces may be seen as an interrogation of the notion of the immateriality of our interaction with digital technology, and, perhaps even a challenge to the notion of a stable virtuality.

More significantly still, and in keeping with Julia Kristeva's[14] framing of abjection, it is offered by VAINS as a challenge to the stability and sovereignty of the self in relation to the image and to the technologies that enable both its creation and its conception.

In addition to the visceral and bodily traces left by users of digital technology, we also invite visitors to consider the many other traces of themselves that they (often unwittingly) leave behind. Bruno Latour[15] has framed these traces as representing a significant erosion of the differences between the private and the public.

Collecting and instrumentalising data from users of web sites, whether covert or consensual, is now part of the materiality and medium specificity of the web. But the traces Bruno Latour writes of are arguably rarely made visible to the users who have left them. VAINS makes these traces part of the materiality and navigational structure of the platform.

The Neural Art Navigation Tool (N.A.N)

The Neural Art Navigator is a physical computation system that deploys EEG to sense the electronic brainwave frequencies of individuals while they are visiting online art sites. The system analyses the patterns of electroencephalographic signals and matches them to suitable art works based on a collaborative filtering algorithm developed over the last two years. The system has been empirically tested and the reactions of users qualitatively observed while they experience a seemingly sub-symbolic, autonomic process of interaction with online art works.

Thus far the architecture of the Neural Navigator has been influenced by an enactive and situated methodology that privileges action over *a priori* goals, and instead seeks an emergent, fluid and constantly changing set of navigational pathways. In pursuing a loosely enactive methodology the EEG based system currently configures itself uniquely to each individual, first observing the flow of their

brainwave activity in order to calibrate the system, then allowing for a period of further observation before forwarding users to artworks that have been curated with consideration of the putative 'states of mind' that might correlate to alpha, beta and gamma waves (etc).

In a recent experiment, 11 users have tested the N.A.N system. The goals for this experimentation were: 1. Evaluate how the system functions; 2. Examine the ability of the system to enhance a different viewing and browsing experience; 3. Test whether an embodied experience has been encouraged through the use of the system; 4. Finding whether the use of this system has enabled a different relationship between the viewer and the artworks, and between the viewers and themselves.

Our results have revealed that the use of the N.A.N tool has increased the occurrence of self-reflective thoughts and bodily awareness in most of the users' experience. Interestingly, it seems that more than anything else, what enabled an elongated encounter with the artworks, as well as a relationship to them, was the appearance of the system as reflecting the user's state of mind, suggesting a subjective interrelation between the viewer and the content.

We have also found that most users, while using the N.A.N tool were considering issues of control and arbitrariness. Many of them testified that they were questioning their control over the technology, as well as their control over their own mood and their own mind. This is significant in our attempt to create both unpredictable means of discovering content online, but even more importantly; it seems the use of the system has enhanced a liminal system of interaction, where users find themselves on the threshold between control and non control; self awareness and immersion in external content. These conclusions have been meaningful to our interest in developing a system which questions relationships between subject and object generally, and specifically in the context of computational and technological environments. It has also been a stepping stone in creating a system that leaves users open to interpretation.

Conclusion

The VAINS practice hinges around the tensions inherent in the construction of subjectivity, singularity and collectivism, but, as many of the writers we have referenced maintain, we cannot easily reach a consensus as to what a subject is or even if such an entity really exists. This ambiguity and fluidity is an instrumental presence within this practice, to quote Barbara Bolt, it is a practice in which *'the materials are not just passive objects to be used instrumentally by the artist, but rather the materials and processes of production have their own intelligence that come into play'*[16]. This becomes a case in point in our deployment of collaborative filtering within the VAINS platform. In VAINS collaborative filtering assumes both non-instrumental and instrumental qualities according to the unpredictable materiality of the dynamic system at play. Non-Instrumentality is described by Low-grade as 'aesthetic, lucid and social qualities'and instrumentality as 'usability' and 'usefulness'.

In the case of VAINS we are producing a system that is open to interpretation on many levels, from the interface itself, to the overarching significance of the entire system.

References and Notes:

1) International Council of Museums sets the minimum standards for museums professional practice.

2) http://www.computerfinearts.com/collection

3) Geoff Cox, Curating Immateriality, Autonomedia, 2006; Beryl Graham & Sarah Cook, Rethinking Curating, MIT Press, London, 2010

4) An Aesthetic Experience reorganizes viewers experience of life; inspired by John Dewey Art as Experience, and Maurice Merleau Ponty writings on art

5) Andre Bzin The Onthology of the Photographic Image; Roland Barthes Camera Lucida for example

6) Transparency, Jay David Bolter in: Windows and Mirrors, MIT Press, London, 2005

7)Examples: http://gallery9.walkerart.org; http://rhizomw.org

8) Examples: Art venues in 2nd Life; http://www.boehmkobayashi.de/tradecenter/index.html

9) Alva Noe, Action in Perception, MIT Press, 2004

10) H Maturana & F Varela, The Tree of Knowledge, Shambala

11) Lucy Suchman, Human-Machine Reconfiguraions, Cambridge Uniiversity Press, 2007

12) Elizabeth Grosz, Volatile Bodies Towards a Corporal Feminism, Bloomington: Indiana Uni. Press, NY, 2011

13) Claudia Roda (ed.), Human Attention on Digital Environments, Cambridge Uni. Press, NY, 2011

14) Julia Kriesteva, Powers of Horror, Cambridge, 1982

15) Bruno Latour, Beware Your Imagination Leaves Traces, Times Higher Literary Supplement (6/4/2007)

16) Barbara Bolt, Art Beyond Representation, London: IB Tauris, 2004

THE IM/POSSIBILITY OF TIME REGAINED: NAVIGATING THE UNSTABLE PAST, PRESENT AND FUTURE OF INTERNET ART

Annette Weintraub

Anxiety about the passage of time is traced from Proust to the current obsession with data overload and real time is interrogated by looking at historical and current work in various media of art that embodies either slowness or time adrenalized. The experience of duration in web-based art and adaptation to rapid change in the preservation and conservation of art made for the Internet is also touched upon.

Fig 1. Industrial Strength [CitySliders], 2011, Annette Weintraub, JQuery animations, dimensions variable. ©2011 Annette Weintraub.
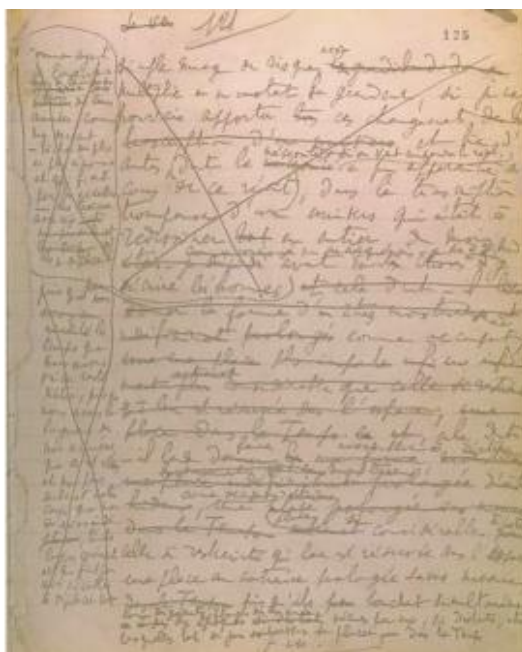
Fig 2. Time Regained, manuscript last page, Marcel Proust, 1922, Gallica Bibliothèque Numerique, Bibliothèque Nationale de France. Public domain.

Fig 3. Time Regained, manuscript notebooks 69 and 75, 1916-17, Gallica Bibliothèque Numerique, Bibliothèque Nationale de France. Public domain.

The perception of time accelerated

By titling the last part of his three-volume novel "In Search of Lost Time" ("À La Recherche du Temps Perdu") as "Time Regained" ("Le Temps Retrouvé"), Marcel Proust, in the first decades of the 20th century, captured and anticipated our contemporary anxiety about time and consciousness of time passing. The last manuscript page, so poignantly layered with excisions and edits reads like a time-lapse image of his process, a one-page hypertext. [1]

A modern phenomenon, the sense of the onrush of time is a result of the increased rate of change since the Industrial Revolution. In recent decades, and with electronic media, this change is perceived as an unstoppable tidal wave of 'too much information.' Consciousness of change has evolved, from a general awareness of accelerated time, to an acutely internalized sense of change. This paper will examine the experience of duration in some web-based art and briefly touch on issues of adaptation to rapid change in the preservation and conservation of art made for the Internet.

ANXIETY AND CHANGE

"The enormous multiplication of books in every branch of knowledge is one of the greatest evils of this age; since it presents one of the most serious obstacles to the acquisition of correct information, by throwing in the reader's way piles of lumber in which he must painfully grope for the scraps of useful lumber, peradventure interspersed."   Edgar Allan Poe

In 1845, Edgar Allen Poe raged against the explosion in book publishing; his perception of the threat to attention and quality anticipating both Alvin Toffler's (1970) book "Information Overload" and Richard Saul Wurman's (1989) work "Information Anxiety." Toffler reported on the increased stress and impaired judgment consequent to rapid change, while Wurman offered coping strategies for information overload.

More recently, Nicholas Carr [2] has hyperventilated about how the Internet, social networking and the culture of instant response might be actually changing our brains and making us less able to engage in focused attention and deep thinking. While most of this is overheated rhetoric, there is pervasive unease over the perceived acceleration of change and the flood of new sensory inputs and flow of information.

WHAT IS 'REAL TIME'?

Yet if speed, fracture and overload are the outcome of the 20th century celebration of dynamic change, there are also works of contemporary art which engage 'real time' and slowness as counterweight. It's also possible that 'real time' as an artistic investigation became of interest just as our perception of actual real time in lived experience was eroding.

In Warhol's "Empire" (1964) [3], time is experienced minute-by-minute, with a slowness that can be meditative, contemplative, immersive or alternatively boring, suffocating and lacking drama. Warhol's film was shot at the offices of the Rockefeller Foundation in the Time-Life Building on July 25 from 8:06 p.m. to 2:42 a.m. It was shot at 24 frames per second but is projected more slowly, at 16 fps, so that 6 hours and 36 minutes of footage take about 8 hours to screen.

"Empire" focuses our attention on an iconic structure, seen over time. A viewer might zero in on the minute changes of light, color and background detail even as she twitched in boredom after hours of viewing. Or, she might settle into a reflective and highly conscious state.

From 1999 to 2004, in a web project that recapitulates that history in an homage to the Warhol film, Wolfgang Stahle installed a webcam in his office at The Thing which pointed at the Empire State building, and sent a stream of frames to an exhibition in Germany. [4] The project, called "24/7," changed the sequentially projected frames of Warhol's film into a discrete and even more attenuated sequence, making us aware of the continuum of time extended.

Experimental film of the 1960's also explored the perception of elapsed time. Michael Snow's influential film "Wavelength" (1967) captured non-dramatic time in a way that produced a hyperawareness of each second of duration. Snow is said to have described "Wavelength" as "a continuous 45-minute zoom across a New York City loft." [5] But it is much more than that. We see the continual play of shifts in color, apparent visual changes due to time of day, double exposures and very slow changes in framing, all belying Snow's simple description. Experientially, it is a 45-minute rollercoaster journey into the minutiae of daily life and a deep exploration of the relative perception of time.

Both Warhol and Snow's work may be seen as antecedents to entire genres of online work that incorporate continuous feeds from webcams, surveillance video or CCTV camera.

TIME ADRENALIZED

Yet even 'real time' isn't safe from acceleration. The 'real time' format of the TV series "24" is paradoxical: the minute-by-minute equivalence between plot action and viewing time is precise, yet the action in each moment of narrative is hopped-up and feels like real time on methamphetamine. [6]

The ticking digital clock, like the timer on a bomb, counts down the minutes of the hour, the quad-screen format multiplies the sense of urgency. The digital clock makes us aware of the moment, but alienates us from being in the moment. Perversely, as it ostensibly matches real minute for narrative minute, "24" gives us a speeded-up reality that is the opposite of "Empire." In Warhol's film there are many moments where nothing 'happens' and it feels like pure existence. In '24',' life is reduced to pure speed, with instantaneous choices and action at an unsustainable pace. The artificial tempo has an interesting effect: it intensifies duration and makes momentum addictive; the perfect format for an ADD (Attention Deficit Disorder) culture.

EXPLOITING DURATION IN INTERNET ART

The image of real time adrenalized is an apt framework for looking at the challenges to artists working with technology. For early internet-based work, slowness was not a problem, it was a condition. In the era of dial-up, and of web pages of less than 33k in size, it was a priority to speed up download, hide the delay while preloading in the background, or use a progressive jpg to 'animate' the wait time. GIF animation, which was invented in 1987, also provided an illusion of speed, as did meta tag refresh animation.

Recently, the image blinking and color cycling of '90's GIF animation has been reinvented as a retro popular practice that paradoxically embodies both speed and slowness. The GIF animations of Tom Moody [7] have the frenetic and wacky quality of early GIFs but with a new playfulness and sophistication, while Nicholas Sassoon and Sarah Ludy, members of the artists' group Computers Club, have used GIF animation meditatively, particularly in a dreamily slow installation titled "Wallpaper" (2011) [8]. The repetition and cycling in their GIF animation creates a receptive space for extended duration: optically fast, but experientially slow and attenuated.

CHANGING PERCEPTIONS OF DURATION, ACCLIMATION TO INSTANTANEITY

The constant competition for our attention span is certainly a factor in how we perceive duration. With growing availability of broadband there has been an explosion of sites online: currently there are 346,004,403 unique Internet hostnames compared to 18,000 in August 1995. [9] There is too much to see, and not enough time. This parallels the 'real world' as in the "8-second rule," a widely-reported statistic that calculated the amount of time a typical museum viewer spends in front of a work of art.

Coincidentally, 8 seconds is also the estimate of how long a web viewer waits on a download before hopping to another page, (although it now is being downgraded to 4 seconds). As we juggle multiple devices simultaneously, there's less tolerance for 'the wait' and more asynchronous I/O attention; it's packet switching instead of network switching. Online, slowness is by default defined as a problem, and the expectation is for immediate response and constant stimulation.

DURATION PROFILES

The duration profile of different media is something I've considered since my first web project in 1995. At that time, because of bandwidth considerations and access mostly by dial-up, the Web was strongly text-based. "Realms" used paired text and image to create an intimate bond with the reader, develop an online narrative and to mitigate the download time.

At home, at a café, or in a gallery, a work that's on an individual computer can connect in a way that is altered when the same work is projected for multiple viewers. The one-to-one relationship is appropriate for the intimacy of storytelling. Text also has an internal metronome that is constant—while a phrase or headline can be taken in at a glance, reading, even rapid reading, requires duration and self-limits speed.

My online projects since have mixed reading, hearing and seeing, using the intersections of repeating content in different formats to create a layered experience. This can produce a mediated overload, in which repetition or the restatement of themes, iconography or ideas emerge as the viewer cycles through overlapping iterations of text, audio and image. It also provides a way for the viewer to become immersed in a narrative environment.

"City Sliders" (2011) is a series of in-progress JQuery animations that explore the surface of urban space using moving text fragments and images. These animations construct a visual narrative about the texture of urban space using a repeating rhythm of horizontal and vertical directionals that change scale, weight and pattern and which represent the 'skin of the city.' The images are overlaid with texts that speak to the relationship between underlying structure and external appearance. "City Sliders" incorporates original photographs and images from 3D models that were built, lit and texture-mapped in Cinema4D; a later iteration will add ambient sound and audio monologue.

"One Text, Many Stories" (2009) was based on the idea of repeating a single text in a variety of visual contexts in order to elicit different readings through alteration of visual context. An original text composed of nine short passages describes an urban space reconstituted in memory, and is interspersed with short extracts from Michael de Certeau's "The Practice of Everyday Life" and "The Production of Space" by Henri Lefèbre. The text fragments can be read in varying order (not necessarily in entirety) and reinterpreted as the images and page structure change. Each page was configured differently in CSS so that page elements expanded, changed format or position, re-sequenced or were given different emphasis, depending on the dimension of the browser page and the viewer's interaction.

"Crossroads" (2000) mixes overlapping sound, moving image and text in purposeful cacophony to represent the visual and aural landscape of Times Square. "Crossroads" also explores how film genres and advertising culture shape our sense of place. Based on elements of the mythic and actual Times Square and 42nd Street, each page has several looping texts and animations; the audio monologues are activated by rolling over the animations, but play independently and are not synched. Two actors speak from different perspectives: a film buff describes how Times Square has figured in film and a storyteller presents a series of fictive narratives in monologue. "Crossoroads" also represents for me the difficulty of conserving or migrating Internet projects in an era of rapid change. The original (and still extant online form) which included programmed QuickTime, Flash and Javascript has been updated several times due to changes in scripting versions and is more easily seen in an archived video. [10]

RIDING THE WAVE OF RAPID CHANGE: CONSERVATION, ARCHIVING AND ADAPTATION

As an artist making projects for the Internet, I am aware changing technology pushing me forward in new work at the same time as I am looking backwards at projects that have been stranded or mutated unpredictably through browser obsolescence.

This pull of simultaneous opposing directions creates a Proustian nightmare in which the involuntary memory is not the savor of a treasured bite of the past, but a nightmare reverie on the instability of past, present and future. In this context, slowness takes on a different meaning: an awareness of the quicker and shorter life cycle of a technology.

Humans are said to be the only animals that have foreknowledge of their own death; new media artists now have inescapable foreknowledge of the possible loss of their work. The 'shelf-life' of art made in the context of this rapid evolution, can be short and this may be inherent in the environment, a feature and not a bug. Electronic arts pose difficulties of conservation, archiving and preservation that are of a different order of magnitude than other arts media. These works can have a long gestation and a short lifespan.

Old media can be subsumed by newer media and their characteristics can migrate (leaving the signature of the older media behind, but transferring essential attributes, as in the evolution of wet to digital photography). But while media can migrate, individual works may disappear. The rapid evolution of web tools creates an underlying instability that is a constant in making work for the Internet. While a work may embody some aspect of slowness, the context of the work is anything but slow.

MANAGING SHELF-LIFE

Net artists are particularly aware of the issue of retrofit fatigue: anyone who has gone back to update old projects understands the conflicted emotions of wanting to preserve older work while preferring to do new work. There are also issues of temporal context, of how to frame work that utilized or incorporated some technical element that was notable at the time, but which is incomprehensible or seems unremarkable once its moment has passed. Retrofit is more straightforward when content is central, but shifts in technologies do alter meaning.

There are several options for dealing with this issue: accept the expendability and ephemeral quality of net art and let it break; migrate the work to the current net environment by updating; or show the work in another format that may convey the appearance and preserve the content, but is no longer the original work. In the case of work that has stopped functioning, or which is beyond reconstruction, documentation seems the only course, and in fact, this is the approach taken by many Net artists who show screenshots or make videos of a web project interaction.[11]

SLOWNESS AS WILLED EXPERIENCE

To work on a constantly shifting platform and in an environment of short shelf-life is to live with instability. To make work that asks the viewer to slow down in an atmosphere of accelerating change is paradoxical, perverse, even counterintuitive. It resists much of what we think of as the inherent properties of life online: speed, instantaneity, divided attention, a 'quick read.'

But like meditation, slowness can be thought of as a practice, and a willed experience. And like meditation, the practice of slowness opens up space for reflection and engagement. Returning to the online images of Proust's manuscript pages, his handwritten notebook pages overlaid with bits of pasted paper, the 'paperoles,' [12] extend out from the parent page, and seem to also expand outward in time and space, in a visually apt metaphor for the lived duration and layered experience they inscribe.

References and Notes:

1. *Marcel Proust, "À la Recherché du Temps Perdu," 1922. http://expositions.bnf.fr/proust/grand/315.htm.*
2. *Nicholas Carr, "The Web Shatters Focus, Rewires Brains," Wired, June 2010, http://www.wired.com/magazine/2010/05/ff_nicholas_carr/all/1.*
3. *Andy Warhol, "Empire," 1964, http://youtu.be/ZqDHuaVFlyw.*
4. *Wolfgang Stahle, "24/7," 1999–2004, webcam sequence, http://www.medienkunstnetz.de/works/empire24-7/.*
5. *Michael Snow, "Wavelength," 1967, http://www.medienkunstnetz.de/works/wavelength/video/1/.*
6. *"24," YouTube video, http://youtu.be/6nvKN_H4e-I.*
7. *Tom Moody, website, http://www.tommoody.us/archives/category/animations-tm/.*
8. *Nicolas Sassoon and Sara Ludy, "Wallpapers," 2011, http://319scholes.org/july-14-2011-wallpapers-by-nicolas-sassoon-and-sara-ludy/.*
9. *http://news.netcraft.com/archives/category/web-server-survey/.*
10. *Annette Weintraub, website, http://www.annetteweintraub.com.*
11. *Frank Marchese, "Conserving Digital Art for Deep Time," Leonardo, Volume 44, Number 4, 2011. Ben Fino-Radin, "Digital Preservation Practices," Rhizome.org, http://rhizome.org/editorial/2011/aug/5/keeping-it-online/.*
12. *Proust 'paperoles,' 1916-17, Bibliothèque Nationale de France. http://expositions.bnf.fr/proust/salles/5/index5.htm.*

W0RDM4G1X. OR HOW TO PUT A SPELL ON MEDIA ART ARCHIVES

Nina Wenhart

Aaa, sdafsda, sxjhk hfjk asfjkl. What reminds of onomatopoeia or a poem by Ernst Jandl, are actual tags found as descriptive metadata in online Media Art archives. I call these words magical because they conjure up works and knowledge from the depths of the archive. Magical also, because who but a magician would know about the "spell" sxjhk hfjk asfjkl?

What and if we actually find something in an archive significantly depends on the quality and accessibility of the descriptive metadata assigned to the artworks. "Word magic" provides insights into ways of capturing ephemeral Media Art via descriptive metadata and creating a system of order.

The objects of investigation of this paper are database archives for Media Art. As such I define databases that are mainly documentation archives and have in large parts taken over the role of the classical archive for the field of Media Art; archives that do not necessarily refer to a parallel physical storage/collection, but the (online accessible) documentation archive that can also exist on its own. For in Media Art, what is left to archive very often only consists of documentation material. Such a database archive is about creating order by managing sense, by making statements through this order, by creating a "Grammar of New Media".

Database archives for Media Art can vary greatly in scope and focus. Some collect physical assets like art works or documentation material, others just describe them; some include their own institution's projects only, others group their archive around research topics. The database archive typically makes intensive use of language to manage and describe the assets. For the system itself, a term is just functional, an index to correlate the assigned data with. On the human (input and output) side, these words also have meaning. The differences in meaning for humans are what make the words such a crucial issue. In these database archives, knowledge and histories are not only stored and managed, but also created and constructed. Because of this, there needs to be a thorough consideration of the processes involved and of how these systems are created. In addition to describing content, a database archive also manages assets and creates order by naming and relating. Most databases are still organized in the manner of a shelf, although no physical constraints force them to re-implement what was only meant as a metaphor in data-space. "The categorization scheme is a response to physical constraints on storage, and to people's inability to keep the location of more than a few hundred things in their mind at once." [1] What might have been useful at a time when digital storage was new – using a metaphor to have something familiar around – now proves to be a real obstacle for the sustainability and further development of the archives: "Now it means that the user has to adopt to the creator's specific view of the world, it has become a dogma. It seems that the GUI and all its metaphors has come into our way. It *seems* natural. How terrible." [2]

The Lack of a Standard Terminology

One of the major problems discussed in the context of descriptive metadata is most widely known as "the lack of a standard terminology" for describing Media Art, as defined in "Capturing Unstable Media" by Sandra Fauconnier and Rens Frommé from V2_ [3]. I question whether this really is a problem or if the observed "lack" offers the key to a new concept for "capturing" and describing Media Art. A lack generally means an undesirable condition. Something is missing, and therefore something else is impossible to achieve. The lack has to be removed. In other words, without a standard terminology, it is impossible to correctly and comprehensively describe Media Art. Over the years, several attempts have been made not only to describe Media Art, but also to capture the correct terms and their interrelations; attempts to settle the preconditions for any valid definition hence on. As of now, the goal has not been reached; and looking back at the histories of these attempts, it can legitimately be assumed that it never will. For good. No final standard terminology could ever be assumed, as no final point of knowledge can ever be fixed. However, the problem addressed in the "lack of a standard terminology" is a question of language, the necessity of using it, the observation that the existing methods are not sufficient for the task at hand, the fact that language is an unclosed system, and the difficulties arising from dealing with this fact.

Terminologies do more than just name objects and stick labels on them. By not just being assigned to the artworks, but also being ordered themselves, they create structures, a "Grammar of New Media". The goal of a standard terminology is to find the agreed meaning of a term and its unique place in this world, of the correct assignment between an entity and a term (i.e. a manual for correct application) in order to decrease semantic heterogeneity. The term is treated like a physical object. The standard terminology should make meaning and order clear and self evident - "natural", not to be doubted, but being attributed universal validity, truth value, true or false, following a bivalent logic, black or white, no gray in between, good or bad – it is, in short, a simplifying model that is achieved by a reduction of complex situations. By offering a limited number of preferred ways of naming and ordering, by creating unambiguity, by erasing doubt, belief in this "god" equals belief in the creator of the database archive. The creators are interpreters of the existing sources. For the descriptive metadata, their selection is based primarily on their own interpretations (fact is dealt with separately). Essence and interpretation are both problematic when it comes to creating order, because they *appear* to be natural instead of culturally constructed. The resulting system is absolute.

Semantics on the other hand consist of creating a dense network of interrelations, of having multiple – even conflicting – relations, of creating meanings through nets of relations and of revealing sense and meanings on a context-dependent base. A standard terminology would erode multiplicity and density that are necessary ingredients of semantic networks in favor of *the* preferred way of reading. Homogeneity instead of heterogeneity, hegemony instead of free and open choice, creation of one for many and not of many for many, static instead of variable media through static instead of variable language. In the end, this is a question of exercising power and authority; it becomes, it*is* political from the very beginning.

Dealing with Diversity

The "lack of a standard terminology" does not mean that there are no terminologies. As a matter of fact, many different vocabularies are in use, in different database archives, created by different authors, covering different aspects, etc. The problem of the "lack of a standard terminology" is a matter of how to

deal with diversity of expression, of perception and interpretation. And it has various effects: the process of perception is influenced by multiple factors, like previous knowledge, the culture of the interpreter, awareness, different goals and contexts, just to name a few. Different interpreters perceive different aspects and name them differently. The same term can have multiple meanings for different people or in different disciplines and contexts. Diversity is a matter of meaning, of the use of language. As previously discussed, in a database archive words not only have a naming function, but these names/labels are structured and structuring. Terms are functionally implemented in the database archive, language becomes a technicality. The result is that out of technological necessities of the database models applied, the many meanings and places of a term are often reduced and narrowed down so that preferably only unambiguity remains. This is then called the "preferred way of reading". The impacts on openness, the character of the resulting knowledge base and finally its sustainability are massive and therefore need to be analyzed critically.

To briefly summarize an analysis of current database archives I created for my Master Thesis shows that the challenges and problems identified in current database archives are:

1. **Rigid hierarchical structures** that very often are one-directional and exclusive and hard to change once they are implemented. This specifically poses problems for the further development of a database archive, which is unavoidable. Each new category challenges the system as a whole.

2. **Faking fixed meaning** ignores that one word can mean different things and have different connotations in different disciplines and contexts (incommensurability, terms used are relative to a scheme) and also ignores that Media Art draws elements from a variety of disciplines. A model of fixed meaning results in a narrowing down of these many perspectives, roots and influences, which can in the best case be described as incomplete, in the worst case it leads to wrong results.

3. Vocabularies follow the the **internal logic of their creators**. This poses a very real and practical problem: as people mostly do not enter a database archive from where its creators plan, namely the platform's start-page, but from a search-engine, they will rely on the words and associations they come up with. The logical consequence for database archive creators should be to respond to their users and to incorporate as many different associations, meanings, ways of spelling, synonyms, maybe even typos... they can think of. Even if the creators would succeed in finding the perfect expression, how would the users know how to find it? How would they convey their word magix to their audience? Creators of such database archives need to address these semantic and interpretation issues, if they successfully want to build and sustain their projects.

4. **A standard terminology for Media Art contradicts itself**. Media Art feeds from various disciplines, crosses boundaries and unites them, resulting in not just a mix of the latter, but also in additional new meanings ("the sum is more than its parts"). Currently applied terminologies reduce the many dimensions to just one (over simplification) or mix what shouldn't be mixed (incommensurability).

I suggest that Ludwig Wittgenstein's concept of Family Resemblance offers a viable model to avoid the problems caused by current approaches.

Ludwig Wittgenstein's Concept of Family Resemblance

"The idea that in order to get clear about the meaning of a general term one had to find the common element in all its applications has shackled philosophical investigation." [4] In Wittgenstein's own Philosophical Investigations, he introduces a new paradigm for ordering. The concept is easy to explain: Instead of finding one assumed core element that is necessary and common to all members of a class, they are connected by a whole series of criss-crossing and overlapping features. Not by identity, but similarity. This kind of relationship is what Wittgenstein calls Family Resemblance. It offers a solution to what cannot sufficiently be defined by a class-system or – as Wittgenstein wrote - to avoid "the bumps that the understanding has got by running its head up against the limits of language." [5] With this concept, Wittgenstein rejects all taxonomic classification as essentialist and shows the limitations of any hierarchical system built on words: That reaching final accuracy in language is an ideal.

A class is defined explicitly by a core element, a family on the other hand is described by its rules. And – as he continues in his concept of Language-Games [6] – these rules are not fixed once and for all, but made up and modified "as we go along." [7] They are the (temporary) results of a common activity, and to be effective and meaningful they have to be agreed upon by the "players". While the traditional classification system was not correct, but effective in pre-computer times, nowadays Wittgenstein's model of a non-essentialist ordering system provides a real alternative for descriptive metadata and ordering systems. What does Wittgenstein mean by "rules" and how could this concept be weighed against the concept of classes?

The importance of rules or of following rules is one of Wittgenstein's main interests in his analysis of games. Rules are conventions. They are not right or wrong in a logical sense; they are just useful. The meaning of a word is the result of following rules. So to fix the meaning of a word by linking it to a thing is just one particular view, not *the* view. What makes a rule different from a definition is that it describes an action, a move, gives direction, but remains flexible. A definition on the other hand cements the flexibility of a rule by locking the meaning. To fall under a definition, necessary and sufficient characteristics have to be fulfilled. A rule on the other hand is much more open. The members of both family and class are interlinked with each other. But instead of resulting in a hierarchy, a fixed order, a non-extendable model and ideal based on mental entities, a family is a network that can grow by sharing and passing on parts from one member to the other, remixing characteristics and adding new ones. To paraphrase the parent-child metaphor of class-subdivision: Unlike in a traditional classification, in the model of Family Resemblance, reproduction can happen naturally: sex instead of in vitro fertilization. Isn't that more realistic?

Assets are connected and sufficiently ordered by the connections that are established by Family Resemblance. This is radically different from the essentialist tradition. Precisely defined classes are not necessary to understand what something is or what relations it can have. To follow a rule is an action and an expression of a specific view of the field. As there are many ways of interpretation, there are also multiple families something can be part of, multiple connections that can but need not be shared by all members of a family. "And the result of this examination is: we see a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities, sometimes similarities of detail." [8] What still makes the prospect of a standard terminology so attractive is its relative lack of complexity. It reduces the different perspectives to just one, something simple and easily comprehensible and takes away the burden of making a decision. Family Resemblance on the other hand results in a complex network and is rhizomatic. It shows a huge number of connections between things, very general as well as

very particular ones; it does not weigh what is important and what is not. This is a subjective decision and thus part of the process of filtering (on the user side).

In Media Art archives we sort knowledge that is already present. The order is not implemented to discover new relations, new qualities, but the result of pre-perceived classes and pre-assumed relations between them. New things have to fit in an already established world order, which is created and manifested in technology before the assets are filed in. The effect is that we order what we have known before. We remain in already established Language-Games, that have not been developed for Media Art. [9] Instead of developing its own language, Media Art archives play pre-existing Language-Games. This does not mean that the order created is entirely wrong. What *is* wrong is that it presents itself as the only true way of looking at Media Art when it is in fact only one perspective. Only one dimension is highlighted while most information remains in the dark. It is in the nature of such models of (a piece of the) world, that they demand universal validity. We have to remind ourselves that with descriptive metadata we are dealing in the realms of language, something that is not precise. Again, Wittgenstein reminds us of this when he writes: "We want to establish an order in our knowledge of the use of language: an order with a particular end in view; one out of many possible orders; not *the* order." [10] Because of this limitation of perspectives, archives are filters. In current archives, filtering and thus reduction is part of the data-entering phase. Filtering is an important part of getting qualified information. The crucial question is: when does this filtering happen? To avoid a narrowing down of possible perspectives, this process should be an option that is up to the user. Applying the concept of Family Resemblance would allow as many connections as possible in the dataentering phase. The filtering process as a temporary closure would be better suited to being an option for the user.

Conclusion

If the hierarchical structure of vocabulary means a limitation – as Toni Peterson pointed out [11] – why has this remained the building principle for so many database archives' terminologies? I want to recall what Petersen wrote: "The semantic network of a hierarchical structure stretches just over broader and narrower terms and through synonyms and near variant lead-in terms. Building a network of related terms [...] takes on additional significance, especially for the representation of knowledge in a field." [12] Hierarchies cannot just be turned over into semantics without a significant amount of additional effort. Semantics and density of the net are a result of bringing together actual uses of language, from merging vocabularies and allowing multiple relations for each term. A standard thesaurus for Media Art and a semantic net are therefore, in my opinion, two oppositional and conflicting concepts. The semantic net can inform a lexical corpus, but a lexical corpus will not result in a semantically dense net. This investigation is centered around the question of a standard terminology for Media Art or what the lack of such a terminology means for the field. It showed, that contrary to expectations of a solution, a standard terminology poses new and even more severe problems by narrowing, excluding meaning and thereby closing the concept of art. The impact of a decision for such a model is underestimated, as descriptive metadata not only have a naming/labeling, but also a structuring function in the knowledge base. When the weight of a whole system is put on a rather arbitrary choice of words, when meaning is fixed and the number of the building blocks closed, one can not endlessly build upon the resulting structure without experiencing the limitations of the weight it can bear. To avoid limited and limiting database archives, I argued for an alternative model of structuring and labeling, an open framework instead of a closed and rigid structure, one that is based on Ludwig Wittgenstein's concept of Family Resemblance. With an open concept of art and a polythetic approach to descriptive metadata, we comply with the constant changes in and the interdisciplinary nature of Media Art. A network of relations frees us

from the threats of collapsing, overstrained hierarchical systems. Applying and adapting the concept of Family Resemblances values and sustains the conceptual openness and rhizomatic interconnectedness of Media Art. We need to get rid of apriori schemes all together and shift from a fixed corpus to an open framework to develop a sustainable model for descriptive metadata.

References and Notes:

1. *Clay Shirky, "Ontology is Overrated: Categories, Links, and Tags," Clay Shirky's Personal Web Site, 2005,http://www.shirky.com/writings/ontology_overrated.html (accessed June 6th, 2011).*
2. *Ibid.*
3. *Sandra Fauconnier and Rens Frommé, "Deliverable 1.2. Documentation and Capturing Methods for Unstable Media Arts," 2003, http://bit.ly/rsTCOw (accessed June 6, 2011).*
4. *Ludwig Wittgenstein, The Blue and Brown Books (New York: Harper Torchbooks, 1965), 17.*
5. *Ludwig Wittgenstein, Philosophical Investigations (Malden: Blackwell Publishing, 2001), 41e, §119.*
6. *Ibid., 4e, §7: "I shall also call the whole, consisting of language and the actions into which it is woven, a 'language game.'"*
7. *Ibid., 33e, §83: "And is there not also the case where we play and-make up the rules as we go along? And there is even one where we alter them-as we go along."*
8. *Ibid., 27e, §66.*
9. *For example by adapting existing standard terminologies like the Getty Art & Architecture Thesaurus (ATT),http://www.getty.edu/research/conducting_research/vocabularies/aat/(accessed June 6, 2011).*
10. *Ludwig Wittgenstein, Philosophical Investigations (Malden: Blackwell Publishing, 2001), 43e, §132.*
11. *Ibid., 27e, §67.*
12. *Ibid., 10e, §23.*

(HE)ARTBREAKING TO THE CORE. ZOMBIE DATA AND THE ARTS OF RE/DE/TRANSCODING

Nina Wenhart

Digital corpses all abound, zombie data that is still there, but cannot be performed anymore. Besides archivists' efforts to revive the work in its original state, artists have developed their own strategies of embracing errors and glitches of re/de/transcoding processes and open up a dialogue of sameness and change, obsolescence and progress, memory and forgetting, positioned as an antithesis to constant technological progress and perfection.

An Art Historical Perspective on Methods

With net.art and non-programmers learning to write in html, it first became widely used that artists would use code as material. From the very start they played with its rules, modified existing systems, tinkered with obsolete data. Through intentional creative abuse and a playful disrespect for indus-try/proprietary protocols they rip open a Wunderkammer for re/de/transcoding, compression artefacts and feedback. Of omnipresent obsolescence, endless errors, forced failures, and grown glitches, thereby defining a New Language of New Media, full of references and relations, ruptures and departures. Defining Media Art as a process, not as a product.

Art Historically we can find similarities to the Situationist International's détournement, appropriation art, readymades, sampling, cut-up, bricolage. The list is endless. Yet, there is something radically differ-ent between Digital Art and its predecessors. It is thedirect impact code has on an artwork, its operabil-ity as well as its look and feel. In pre-digital artistic practices, new layers of information and meaning were packed on top of the old. With reusing and modifying code, the layers in the back are reworked. The artwork is opened up, declared unfinished, its multiple dimensions and unrealized potentials ex-posed. Signal processing is de-&reconstruction in its original architectural sense: it reworks the very stat-ics of code.

This approach is often described as creative abuse; a mutiny of the inscribed politics of protocol. Artists such as JODI, Rosa Menkman, Sven König et al go on a quest to discover and exploit the flaws of these systems, find their loopholes and weaknesses to tweak and bend until a satisfactory mayhem results. An assault on code as an assault on culture "for language under technological rationality is functionalized, rendered pure instrumentality; and its repeated use is also internalized as social behavior." [1] Or, as Herbert Marcuse writes in One-Dimensional Man, "the Great Refusal - the protest against that which is", the axioms of consumption as the unquestioned a priori of our culture are under attack. "Whether ritu-alized or not, art contains the rationality of negation. In its advanced positions, it is the Great Refusal – the protest against that which is. The modes in which men and things are made to appear, to sing and sound and speak, are modes of refuting, breaking, and recreating their factual existence." [2]

In analogy to what Tilman Baumgärtel writes about game art, this approach "is critical and ironic, disre-spectful and deconstructivist. The artists do not take technological dispositives for granted, but rather

manipulate and abuse, circumvent and modify," [3] thereby not only altering the source code, but on a meta level the very structures inherent to it; the rules for working with&&in a particular system. The game of Digital Art is taken to the next level, playfully, skilfully. The modifications are simultaneously texture, context, code, law, functionality. These interventions make the immaterial code tangible, concrete poetry, dys/functional, stuttering image. The text is speaking in an unfamiliar voice, often nonsensical, abstract. The artists lead us into semantically unnegotiated space, a new territory where what we perceive does not have meaning yet.

Baumgärtel describes "customizing or even redesigning digital code" as a form of hacking. Hacker culture has become a role model for artistic political disobedience, critique and aesthetics. Out of a "lack of respect for technological givens" technology is challenged and disputed on its own terrain [4], playfully driving any system into schizophrenia and towards epic fail, pure and absolute aggression and irony, "laughing terror" (Thank you, Mr. Bazon Brock). Just like in game hacks the artists test their skills against the systems/authorities, pervert the rules and declare them suspended, defining anything as potential playground. To analyse these processes, we have to unwrap them from their original form/ula/tion and focus on the data's shapelessness, its sleeping potentials. We enter the realms where colorless *green ideas* sleep furiously (Thank you, Mr. Noam Chomsky).

Antimatter

Art that conceptually includes failure poses a juxtaposition to technotopia's hysteria of constant progress, i.e. perfection, crystallization. Failure is unmodern, misplaced in our culture, it is the omni-present / ever-absent meta narrative, an "endless progression of catastrophe and death" (Thank you, Mr. Walter Benjamin). This topos of the "dark side" of progress can be found in steampunk, in dystopias, in the night tales of romanticism. As Slavoj Žižek points out in "Grimaces of the Real", the subject of Enlightenment was the monster. I want to take this a step further and say that it is not only the subject, but the real result. The return of the monster, i.e. the uncanny, a reestablishment of the force of the unknown. These monsters are built and constructed out of reused, broken remnants of once shiny and promising, then discarded futures. They are failures. Cyborgian organisms. Eternal heterogeneity. Always in flux. Conscious of their partiality, temporality, temporeality, temposurreality. They are temposensitive devices with a strong sense of morbidity. Forever undead. Zombies.

When code is reinterpreted, re-repaired, and re-re-reused its function and meaning changes.-This change creates dis/continuity, sustains connections via references. It is relational, pointing to a historical rootedness. JODI's "SOD", while removing most of the recognizable parts of the original, still carries the reference in its title. Rosa Menkman's "Collapse of PAL" is a straight-forward obituary to the death of a standard. Jeff Donaldson commits his artist alter ego noteNdo to a single system. Melissa Barron's Apple II hacks and her glitch weavings pay tribute to a very specific historical computer model and pre-computational contraptions. In all these cases, even though there is a strong connection to the past, the intention of re/de/transcoding is not to dwell on lost times, but to discover through it something new, not yet realized. Therefore this approach can hardly be defined nostalgic. Rather, it is magical. It is about finding the right spell to conjure up the invisible. The meta material is the absent, a constant referrer, permalink to a lack. The conjunctions are simultaneously breaking points, fragile alliances, fluid, because of their original brokenness. Artists tear these apart, rip them open. "Rip it up and start again", as a song title by Orange Juice says. It's a digital punk attitude. Through these processes of ripping, scarring and safety pin mending the antimatter materializes, its potentials shape-shift from immaterial to material.

It is in the "nature" of the medium, this potential to create and evoke certain effects. It is in the politics of the protocols to discard most of them. If one dares to intentionally misinterpret, misuse, refuse to accept the underlying axioms and the closure of the system and hack open this black magic box, Alice's rabbit hole lets us slide into a plenitude of marvels and potentials. Artists take hostage of the information within the hacked systems, re/arrange and corrupt it, make their own interpretations and thus create something new, not in the scope of the policy makers' original intentions. They are politically incorrect so to say, intractable, unruly; digital punk; it's a hacker ethics and aesthetics.

Hacker Aesthetics and Digital Punk Approach

What Karl Popper calls "critical imagination" is the ability to think creatively, outside of the box, to break through given limitations. An unbound curiosity for the hidden potentials and unknown aesthetic qualities of a medium are the driving forces behind art practices devoted to failure. The aesthetics are a consequence of these ethics and just as much a result of the artist's skills as they are inherent to the particular medium chosen, purposely breaking with aesthetic stereotypes of future and progress. A materialization of the medium's crisis and its cries of torture. It is the process that the artists are after, redesigning and redesignating the originally inscribed purpose and aesthetics. Hacking into the magic code that can make miraculous things appear. Working in the spirit of hacker ethics creates hacker aesthetics, as Florian Cramer writes: "Ever since BBS underground culture of the 1980s and net.art of the 1990s, 'hacks' and intentional crudeness of software and hardware design have been embraced as an alternative computer aesthetic. By themselves, they perfectly conform to classical philosophical notions of the sublime as the opposite of beauty. […] It is an aesthetic, however, that constitutes itself as the symmetrical opposite of neo-Pythagorean beauty ideals that have governed computer science from Knuth to fractal geometry, the 'art and beauty' from white-hat hacker culture described by Steven Levy, and the human/computer interface designs of mainstream, high-tech media lab arts." [5] The beauty of this approach lies in the process itself, which is still reflected in the crudity of its temporal appearance. It is Baumgärtel once more who identified that "this ethical believe is at the core of all creative use and more importantly the creative abuse of computer technology." [6]

Making Things Strange

What makes failure so attractive is its surprise effect. Failure "hacks the possibility of automatized perception" as consumption, it's the anti-control. Intentional errors are an anarchic gesture towards the System, and, as Harald Szeemann puts it, have a poetic dimension as they are "allowing the fiasco to actually take place." [7] Delightful terror, beloved destruction, welcomed mayhem, a diversion that upsets the peace of mind of the audience, their learned attitudes. It forces reaction and dealing with the situation by alienating expectations. This strategy gained special prominence in the work of Bertholt Brecht. His "Verfremdungseffekt" (alienation effect) is based on the concept of ostranenie, coined by Russian literary critic Viktor Shklovsky. [8] Ostranenie alienates by means of making familiar things strange, by estranging us from what something used to mean. "I stare at the glitch as a void of knowledge", says Rosa Menkman. [9] While formally indistinguishable, everyday language and poetic language belong to different spheres. "Making things strange" lives of redesignations, decontextualization, violence to the usual and terror to established connections of symbol and meaning. Working with failure creates a poetic language that is simultaneously a meta critique of that language's implemented politics, i.e. the rules of acceptable usage within the system. It is poetic digital disobedience.

Shklovsky defines the purpose of art as "to impart the sensation of things as they are perceived and not as they are known." [10] Baumgärtel quotes Shklovsky in the context of game art / art games, thereby referring to the ludic, playful qualities of ostranenie. Ostranenie refers to playfulness and code=text in yet another way, the game of constructing meaning in language. Language Games, as Ludwig Wittgenstein defines them in his Philosophical Investigation [11] and the necessity of rule-following [12] in order to play the same game. In artistic code interventions such as JODI's or Cory Arcangel's, the rulez of the chosen system are followed, but the rule-following itself is perverted, resulting in ostranenie. The game of meaning is the battle/play//ground for renegotiations on code and meta code levels. While pretending to play the game, subversive actions are taking place. The game is not played, but played *with*. We make up the rules as we go along, says Wittgenstein. [13] These Language Games enable us to leave accustomed positions and open up the magic circle (as in virtual worlds) for the sublime, the strange, the miraculous. It is this otherworldliness that turns something polemic into being poetic. "Poetic language must appear strange and wonderful." [14]

Archival Issues

"It is obvious that our work is against HiTech", JODI say. [15] As diverse as the artworks in this context may be, what many of them share is their interest in decay and a refusal of planned obsolescence. In its own way, such an approach is therefore a form of preservation. Reusing opens up the artwork for its inherent, unrecognized poetic potentials that seemingly defy archival interests while disturbing learned perceptual mechanisms and critiquing unquestioned obedience to the protocols of code and culture. This possibility of opening up a work as well as the necessity to do so in the light of technological obsolescence poses questions whether and how it is possible to archive Media Art. For the scope of this paper, I only want to focus on the question of what accepting the errors and resulting differences to the original look and feel means for preservation. This mainly is a matter of what constitutes a (digital) original.

Reusing and altering finished works seemingly runs counter to all goals of preservation, against the perfect in the sense of the finished, the hard, the crystal. Media Art resembles a Cyborgian organism that rapidly decays, aware of its timeliness. It stands there, amidst the utopia of constant progress of consumerism and continuous future, as the antipode of forever, of crystallized moments and formats, of perfection. "All these moments will be lost in time like tears in the rain", are Batty's final words in Blade Runner. The (unreachable) maxim of eternal life (i.e. the archive) is the perfectly lossless timond (timond = time + diamond, a concept used for example by Morgan Higby-Flowers in "TIMONDs are forever", http://bit.ly/psQYbA). With Media Art being process, not product, stretching over time as well as space, what remains of this concept? If with preservation we mean to keep the original alive, what after all IS the original? For Walter Benjamin, it is defined by its aura, and aura is about presence, the co-presence of work and spectator. Isn't this precisely what is realized by copies and their dissemination nowadays? The aura, it is not lost, as Benjamin predicted. Like a form of energy, it only shape-shifted. If the aura is related to presence and presence is realized by ample dissemination, regardless of a specific format or quality, then true originals are possible on every computer. Viral dissemination processes via YouTube, Tumblr, and other social media platforms create digital originals in zillions of places simultaneously. They are – not only, but also – preserved by being spread. The archive is not so much a place on a single hard drive, but torrents of bits and pieces distributed and shared over legions of community networks. Similar to the dystopian concept presented in Fahrenheit 451, this is how we remember, by re-storing, retelling, remixing, sampling, scrambling."With wide implications for the media archaeological methodology, the archive is increasingly being rethought not as a spatial place of history, but as a contemporary

technological circuit that redistributes temporality in other ways. This is how Wolfgang Ernst suggests theorists and artists to rethink media archeology; not only as an excavation of the past, but as an intensive gaze on the micro-temporal modulations that take place in computerized circuits of technology." [16] The concept of the original – the holy cow of art history – will be slaughtered and Walter Benjamin's seminal text "The Work of ® in the Age of Mechanical Reproduction" has to be reread with a different mindset as "The Work of Art(&facts) in the Age of Viral Remixing".

Being in constant flux as a state of being here to stay challenges traditional archiving and its impossible stasis. For digital media to live, there is no alternative to change. Even doing nothing does something. It creates zombies. Undead shelf corpses that brainlessly stroll around some museum every once in a while. Digital Media Art is an active process, or - in reference to Umberto Eco – an Open Work. Its archiving/preservation has to adapt to this and remain flexible. For now, I would like to call such an approach that embraces variability of all kinds, virality of dissemination, shifting from format fetishism to Free Software liberation "speculative archiving". Media archaeologists Jussi Parikka and Garnet Hertz stress on this aspect, too, when they declare obsolescence of media as an opportunity for active artistic practices rather than merely an archivist and conservative drama. Not the product, but the process, "the circuit, not the past, is where media archeology starts – as an excavation of the timecritical processes of culture; its not only a mode of analysis, however, but a mode of creation as well. This extends the idea of criticism from a second-order reflection on things into a mode of creation. [17] Media criticism within the medium. This indicates a new notion of archiving, criticism and art making alike. A procedural culture instead of a static one. One that fulfills its purpose of keeping alive not by means of crystallization, but by change and dissemination. A digital diaspora. This is not yet another utopia, it's everyday life reality already. We are becoming Johnny Mnemonic. With digital technologies and their obsolescence we seem to move back to historic means of storage, old school fairy tale communities, in which stories are retold and passed on from person to person, generation to generation. Something is lost and something new is added by every passer-on. Some things are remembered, some forgotten. Everyone involved in that game becomes an organic part of this body of knowledge. Digital viral communities resemble oral communities and their ways of preserving knowledge. We are all torrents of information. To the advantage that while a single instance might have a faulty memory, the chance of survival and sustainability of the (fragmented & reassembled) whole are increased. The multitude of storages does more than just make up for individual copies' errors. Repetition is a form of fucking change (Thank you, Mr. Brian Eno).

P.S.: With the recurring "Thank you, xxx" I was trying to find a way to escape the limitation of characters in the footnote section. I hope this is acceptable for you, for this text was intended to be as relational as the artistic practices discussed.

References and Notes:

1. Pamela M. Lee, Chronophobia: On Time in the Art of the 1960s (Cambridge: MIT Press, 2004), 30.
2. Ibid.
3. Tilman Baumgärtel, "Gaming Culture and Computer Games by Artists," http://bit.ly/pAWvoQ (accessed June 6, 2011), 13.
4. Ibid., 5.
5. Florian Cramer, "What is Interface Aesthetics, or What Could It Be (Not)?" in Interface Criticism: Aesthetics Beyond the Buttons, eds. Christian Andersen and Soren Pold, 117-129 (Aarhus: Aarhus University Press, 2011).
6. Tilman Baumgärtel, "Gaming Culture and Computer Games by Artists," http://bit.ly/pAWvoQ (accessed June 6, 2011), 3.
7. Harald Szeemann, "Failure as a Poetic Dimension," in Failure, ed. Lisa Le Feuvre, 194 (Cambridge: MIT Press, 2010).
8. Viktor Shklovsky, "Art as Technique (1917)," http://bit.ly/cqFWht (accessed June 6, 2011).
9. Rosa Menkman, "Glitch Studies Manifesto (2010)," http://bit.ly/dA2P33 (accessed June 6, 2011).
10. Viktor Shklovsky, "Art as Technique (1917)," http://bit.ly/cqFWht (accessed June 6, 2011).
11. Ludwig Wittgenstein, Philosophical Investigations (Malden: Blackwell Publishing Ltd., 2001 [3rd edition]), 4e, §7.
12. Ibid., 70e, §§206ff.
13. Ibid., 33e, §83.
14. Viktor Shklovsky, "Art as Technique (1917)," http://bit.ly/cqFWht (accessed June 6, 2011).
15. Tilman Baumgärtel, [net.art 2.0]: Neue Materialien zur Netzkunst, (Nürnberg: Verlag für moderne Kunst, 1999), 108.
16. Jussi Parikka and Garnet Hertz, "Zombie Media (2010)" (forthcoming in Leonardo Journal, 2012).
17. Ibid.

LIMINOID ACTS

Emma Westecott

This paper applies Victor Turner's notions of liminality to game culture in the context of a particular indie game. This is done via an analysis of both the internal tropes of design exhibited by that game and the broader climate of cultural expansion as typified by the rise of indie gaming.

"Our current experience of life "betwixt and between" recalls what the anthropologist Victor Turner termed a "liminal moment," a moment of passage. It is a moment of anxiety, but it is also a moment of invention and creativity. When Turner spoke of liminality, he understood it as a transitional experience, but for us, living the tension between physical and virtual and between analysis and simulation, seems a permanent state of affairs, our permanent existence on the edge of things." [6]

"Liminality is a temporal interface whose properties partially invert those of the already consolidated order which constitutes any specific cultural "cosmos"." [7]

"One *works* at the liminal, one *plays* with the liminoid." [7].

Introduction

Turner's notion of liminality as a core aspect of society offers a productive model from which to consider the movement of digital games into a creative centre ground as a major art form for the 21st century. Limen [the Latin for "threshold"] in this usage is interested in movements in society whether collective, functional and integrated ["liminal"] as part of rites of passage or individual, critical, idiosyncratic and along the margins of society ["liminoid"]. Turner's interest in broad wide-ranging sweeping change in social structures points to ways in which belief systems have largely been replaced by entertainment in our post-industrial and post-modern society. Modernity has replaced the liminal function in society with multiple liminoid acts that offer a balancing mechanism, a way in the contemporary setting to work through our understanding of core aspects of digital life. It is possible to see game culture crossing a tipping point, or threshold, of cultural acceptance that makes gamers of us all.

Turner's work has proved attractive to game studies scholars interested in the social and cultural impact of digital game form. Dovey and Kennedy [1] use his framing of liminality to point to the generative potential of digital play as "…not just a source of creativity but also a site for the generation of alternative social orders, for political interventions, for utopian imaginings." (Dovey and Kennedy 2006, 35). This paper is interested in extending this view in the context of a particular indie game through an analysis of both the internal tropes of design of that game and the broader climate of cultural expansion as typified by the rise of indie gaming.

Game Culture

Game form is rapidly expanding; its cultural impact grows in significance as turn of the century gamers mature into the mainstream; as knowledge workers, artists, playful parents and creative practitioners. The ongoing movement of digital gaming from a culturally peripheral activity, once the province of a technologically literate subculture, to a mainstream leisure activity and beyond is significant. Games have always been the killer app for technology yet the metaphor of game now reaches beyond any particular technological specificity as material for the current creative generation to identify with – homo ludens indeed.

The inherently active nature of gameplay blurs the boundaries between game player and game maker and many digital games re-frame gameplay to provide spaces to play with rather than games to play through. Sandbox games like Minecraft [2009] successfully illustrate collaborative relationships between gamer and developer in both the openness of the play experience as well as the ongoing technological development of the game itself. The playable art of Minecraft lives on private servers whilst the public display of prowess populates fan video channels across the net refiguring the art gallery space forever. Running alongside the rise of the status of digital games as a contemporary art form are the complex interconnections between game art [in all it's multifarious form] and indie games; do indie games count as part of this art movement? Are we re-playing the false high/low culture divide if we exclude certain types of indie game from the art game canon? How do we ascribe aesthetic value to the sprawl of indie games springing forth like wildfire across the network? Who gets to say which game is art in what way?

Game Design Abstraction

There has long been an amateur game-making community from bedroom coders playing with home computer technology onwards. Digital distribution has enabled these independent game-makers to release their games direct to players in a range of ways: from free-to-play to revenue generating this has grown amateur practice into independent development. At the same time game-making tools continue to become more accessible to aspiring game-makers removing the requirement for programming skills to develop and deliver novel gameplay experience. The aesthetic impact of small development teams is significant, a wash of retro-imagery and lo-fi values break down expectations for the gloss of pro-productions. It may be too early to complete an art history of indie games but it is possible to trace strands of abstraction in many of these experiences. These abstractions are multiple and range from visual style through to game mechanic, although there is often a tendency to prioritize visual production above experimentation with gameplay experience. From pixel art, to minimalism to psychedelia as identified by Magnuson [2] and beyond to the 'bad art' of Cactus et al., the monochromatic silhouetting of Limbo and others, to the hand-drawn line art that dominates many iOS games. This broad stylistic experimentation is both playful and necessary, there is good practical reason for the rise of abstraction in indie games. This aesthetic is often 'cheaper'[1] in terms of production time and allows for designers to focus on the gameplay experience, play with different types of collaboration and to rapidly develop game concepts.

In this context it is interesting to dig in a little deeper to pixel art; as one of the first natively digital art forms pixel art exposes both the history and the apparatus of the screen. Videogames are a digital form and early titles were extremely technically constrained, literally limited in visual display to a specific number of pixels in a set range of colours. Kopstein's [3] Motherboard article "Lo-Fi and The Lost Art of The Pixel" points to the connections between pixel art and past art movements including pointillism,

mosaic and tapestry work. The article also features Cottee's 2010 mini-doc "Pixel – A pixel art documentary" in which game artist Jason Rohrer discusses his attraction to pixel art. Rohrer feels that this type of inherently digital abstraction gives room for player interpretation, allowing a type of space in which meaning-making processes can productively take place. At the same time, in this view, the pixel shows us the hand of the artist literally showing us the rough edges of digital imagery magnified on modern high-resolution screens.

Superbrothers: Sword and Sworcery

Abstraction allows small teams to experiment with different types of collaboration and approaches to development. One such approach is exemplified in the 2011 release Superbrothers: Sword & Sworcery for iOS devices [http://www.swordandsworcery.com/project//]. This much lauded indie release is the result of collaboration between a pixel artist and animator, a rock musician and an indie game developer. Framed[2] as a '21st century re-interpretation of an old school' adventure game S: S&S has been built around an original prog rock musical score that creates an atmospheric and multi-layered responsive aural landscape.

Fig 1. Title, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

The title of the game itself pays homage to a specific sub-genre of fantasy storytelling originating in the late 20's through the work of Texan Robert E. Howard. Sword and sorcery tales typically deal with lands and protagonists in transition and out-of-balance leading to an increase in conflict and also in freedom, in the midst of the liminal moments that accompany key stages of life, specifically in this instance those typical of adolescence. Closely connected with Jungian theories of archetypes, apparent in the multitude of phallic snakes, swords and powerful women, this pulp fiction spawned a rich vein of American literature. This sub-genre is deeply bound to the pre- and early- history of videogames as one source for many role-playing games. S: S&S is full of this mythology, as typified by the naming of the Amazonian

player character Scythian after a lost Eastern European nomadic tribe to offer a protagonist who is an all-powerful and eternal heroine. The interest in Jungian mythology is reflected in the game in its central dreamscape, lunar cycle and magic casting. The developers have blended multiple sub-cultural tropes to build a rich mythic world.

Fig 2. Hiking, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

 Superbrothers game work is clearly identifiable and speaks of a purposeful strategy for minimalism that has then been layered back up to create a distinct visual style. S: S&S is more interested in exploration of a lush landscape as central mechanic, coining the term "scenic gameplay", than in tightly timed or fast paced challenges. Mindfully designed for touchscreens the title is all about exploration. The game is tactile and mode-oriented [with explore and combat modes accessed through rotation of the iPad or iPhone]. Zoomable screens allow the player to move through sparse game and dream worlds connected to a lunar cycle. Conveniently, for my interest in exploring liminality in and around digital game form, S: S&S is generous enough to use the exact word in the course of dialogue with the player. There is an interesting design decision here as the game's player character refers to her experience using a first-person plural voice, e.g. "We", "Our", etc. during the progression of play. This is a design trope of much interactive fiction and directly acknowledges the presence of the player in the gameplay experience. S: S&S features three non-player characters; Logfella, Girl and Dogfella, another character, The Archetype, appears within the Megatome, or in-game guidebook, to provide ongoing clues along with the rest of the supporting cast. Most of the laconic game text segments can be tweeted enabling players to both share progress and promote the game. The game text has a uniquely Canadian voice, dry and understated that works both with and against the fictional mythos of the game world. This contrast creates a game that both looks back and forward to show one way in which modern game design can reflect the culture of its production.

Fig 3. Jim Jam, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

The soundtrack and sound effects of the game are both immaculately layered and respondent to game progress and interaction patterns. This genre of music is particularly well suited for mythic world creation and together with a sparse, yet beautifully animated, pixel art style of muted natural colours [described by the artist as 'rustic 21st century minimalism'] S: S&S builds a unique and evocative game world. It is relatively rare to find a game whose initial design has been primarily driven by music and even rarer to find one that succeeds in blending distinct art practices to create a holistic aesthetic experience. In these, and other ways, S: S&S reveals its ambitions for a loosening of the definition of game; clearly steeped in authentic admiration for game culture this indie title challenges the expectations of the old-school gamer as to what a game should and could be.

Turner's [7] essay refers to the first two of Csikszentmihalyi's distinctive features of "flow experience", which, not coincidentally, are much referenced in contemporary game design, as:

1. The experience of merging action and awareness
2. Made possible by a narrowing of consciousness to a limited focus of attention

This would seem to point to the possibility for minimalism in games to be a more successful strategy for engaging a player in a focused "flow experience". The tendency for tight constraints to be more productive than spectacular excess in creating opportunities for flow is significant. Technological evolution is relentlessly forward facing, chasing realism in an endless loop of repetition on display in much commercial game design. It is not a radical statement to say that much mainstream game design is broken, being too expensive to make to allow experimentation and innovation in form. Yet one of the things that is possible to see on display in games like S: S&S is a looking back - a working through of ideas spawned in early game worlds. This reflection functions as both homage to the early pleasures of game form and as a way of understanding, remembering and recreating the magic of early period games. Through this practice we can see game artists re-visit inherently digital practices like generative art and pixel art not purely as a nostalgic act but constructed as one way forward for innovative game design practice. Games like S: S&S self-evidently represent a next-generation design approach via an original blend of development collaboration and a layering of highly crafted media production onto game mechanics.

Conclusions

Returning to Dovey and Kennedy's [1] work on game culture, the authors point to a collapse of the integrity of play due to its co-option by consumer society. This leads to the type of digital play that we are interested in becoming a form of commodity, a form of productivity in itself. "Play therefore has an ambiguous status - it cannot be said to lie completely outside of dominant systems of power since it is now productive of enormous wealth." (Dovey and Kennedy 2006, 101). This makes the liminoid acts of the independent game industry ever more essential as a critical force for an equitable human future as expressed in and through digital game form. The importance of culturally liminoid acts as a driver for a broadly expressive digital ecosystem in the wider setting cannot be overstated.

Digital technology can be remarkably myopic, in commercial terms this makes absolute sense driving the consumer to always desire the new thus keeping the cogs of capitalist society ever-turning. Yet there has been well over a generation of quotidian living and working with digital technology now surely normalizing our ecstatic dread of the implications of the digital. As the game sector fragments from a multinational mainstream publishing industry to a diverse phenomena supporting multiple development and play practices it seems especially important that we nurture these liminoid acts.

References and Notes:

1. *John Dovey and Helen Kennedy, Game Cultures: Computer Games as New Media. (Maidenhead: Open University Press, 2006).*
2. *Jordan Magnuson "Growing Pains: Video games [and] the future of art." Unpublished course work. http://www.necessarygames.com/growing-pains-video-games-and-future-art/formalism-pixel-art-psychedelic-abstraction (accessed September 8, 2011).*
3. *Joshua Kopstein "Lo-Fi and The Lost Art of The Pixel" Motherboard, http://www.motherboard.tv/2010/5/24/lo-fi-and-the-lost-art-of-the-pixel--2 (accessed September 8, 2011).*
4. *Mihaly Csikszentmihalyi, Finding Flow. (New York: Basic Books, 1997)*
5. *Pixel – a pixel art documentary, dir. Simon Cottee (2010).*
6. *Sherry Turkle, The Second Self: Computers and the Human Spirit. 2nd Ed. (Cambridge: The MIT Press, 2005).*
7. *Victor Turner, From Ritual to Theatre: The Human Seriousness of Play. (New York: PAJ Publications, 1982).*

[1] Meaning easier for small teams to produce

[2] By the project team on http://www.swordandsworcery.com/project/

LOCAL COLOUR AND NETWORKED SPECIFICITY

Mitchell Whitelaw

Local Colour deals with the interplay of specificity and generality – the relationship between the local and material, and the abstracted and systematised domain characteristic of the digital. This paper applies these concepts to digital fabrication, and describes an approach to fabrication that emphasises the specificity of its materials.

Local Colour (detail), 2011, Mitchell Whitelaw, cardboard, dimensions variable.

Local Colour uses generative software and fabrication processes to reflect on digital materiality. This paper briefly outlines a way of viewing the digital / material relationship through the binary of generality and specificity, and applies this view to fabrication. Like other digital systems, fabrication often treats matter as an abstraction, a neutral substrate: Local Colour experiments with an alternative approach that embraces the specificity of the material.

We can describe the world of networked computing – a world where we all spend ever more time – as an infrastructure of generality. It deploys a system that is standardised, formally defined, highly structured, and internally consistent. If I send you an email, I do it trusting that the interlinked systems of hard- and software, the data protocols, the network switches and servers will hold together so that the email you receive is the same as the one I sent. We could say that the network 'generalises' between our two locations.

As I draft my email it exists as a material pattern of voltages and magnetic flux inside my computer. To transmit that pattern effectively, the digital network must correct or resist any local errors or inconsistencies that it might encounter along the way, so that they do not matter. This process applies to all computation and digital media. As Matthew Kirschenbaum writes, "computers ... are material machines dedicated to propagating a behavioral illusion, or call it a working model, of immateriality." [1]

Generality is another term for this "working model"; it is that tendency of computation to function across substrates, to make matter not matter. We can find it at multiple levels: locations on a memory chip, pixels in a display, nodes on a network; in each case the elements are physically distinct but functionally equivalent. Yet computers are material machines, so at every point, the digital is embodied: it occupies a substrate – whether light in optic fiber, magnetic charge on a disk, or holes in a punched card. That substrate is specific: this, here and now. Thus specificity is the twin of generality: in this 'transmaterial' view of digital media, the digital is always and everywhere material, even if it pretends otherwise.

The past few years has seen a wave of digital fabrication work sweep through digital art and design. [2] Fabrication as both process and practice offers a fascinating case study in digital materiality; in particular it is often framed through a distinction between the digital and the material. In an article boosting the revolutionary potential of digital fabrication, Chris Anderson declares that "atoms are the new bits." [3] Generator X 2.0, a 2007 workshop on fabrication in art and design organised by Marius Watz, carried the subtitle "Beyond the Screen." [4]

Anderson's catchphrase suggests a neat opposition between the digital and the material, bits and atoms. In this view, fabrication is a way to make the immaterial material. This is a false dichotomy, however, because the digital was never immaterial. Fabrication is not a process of materialising the virtual (it was already material); instead it opens up new specificities and substrates.

Rather than an ontological leap from bits to atoms, fabrication shifts the cultural needle on a continuum between generality and specificity. In the everyday functionality of digital culture, the specificity of the material is suppressed or suspended; in the recent wave of digital fabrication in art and design, the material comes forward. Yet fabrication as a process depends entirely on the functional generality of everyday computing. The relative emphasis of specificity and generality may shift, but the two terms always occur together.

Local Colour uses fabrication itself to explore these ideas; it is particularly informed by the way fabrication typically deals with matter. Its materials are almost always uniform and homogeneous: sheets of ply, acrylic or cardboard; feedstocks of resin or powder. In an echo of digital generality, they are standardised, interchangeable substrates. In the software that drives a digital fabricator such as a laser cutter, these materials are represented only as a set of attributes such as dimensions and density. So fabrication applies the functional logic of the digital to its materials: it deals with them as abstractions. As such fabrication often enacts a culturally distinctive attitude to matter, in which it is passive and inert, a blank 'stuff' to be shaped by human will.

The Local Colour bowls test out an alternative approach. Here the materials are physically distinctive rather than interchangeable – each bowl is cut from a single box, with its own dimensions, folds, holes, gaps and printed graphics. Fabrication here is a process of negotiation with the materials, as well as a way of thinking about the relationships between matter, specificity and the digital.

At times, material specificity 'reaches back' into the digital process. This tangles the simple causality that fabrication often implies, where matter is a passive thing to be formed. In this project the material feeds back to cause the digital form even as the digital form ultimately shapes the material. For example the dimensions of the bowls are constrained by the source boxes (as well as the laser cutter). The number of slices – and so the height of the bowl – is also constrained by the material available; again this reaches back to inform the algorithm generating the cutting instructions.

At the same time, the digital logic of generality can readily embrace the specificity of the material. For example, a key challenge here was fitting the cut pattern around the folds and holes of a particular piece of material. A logical solution was to measure and roughly model the sheets in a drawing program, then lay out the slices accordingly. The specifics of that sheet of cardboard become digital features: the digital domain encodes some of its attributes, in a way that can adapt to its idiosyncrasies. This digital ability to 'fit' the specific is illustrated powerfully in practices such as projection mapping, where the screen – a classic architecture of generality – is adapted to a specific site. [5] Again digital generality is turned towards accommodating and intensifying the material and specific, rather than ignoring or abstracting it.

'Networked specificity' names the way that the functional generalisations of the digital can turn towards specificity; it is an attempt to hold together the generalising demands of the network with the local distinctiveness of its nodes. In one sense this is simply an account of networked culture as it really is; for each node is, after all, already local and distinct. But more interesting perhaps (especially for the arts) is what the network does. As Kirschenbaum says, the computer acts as if it is immaterial; the network acts as if its nodes are equivalent; fabrication processes often treat matter as a crude abstraction. This need not be the case, as this project begins to show. Rather than simply materialising the immaterial, fabrication can be better understood as an instance of 'transmaterial' digital culture; in which the digital is always material, and its abstractions serve to intensify, rather than dilute, our being-in-the-world.

References and Notes:

1. *Matthew Kirschenbaum, "'Every Contact Leaves a Trace': Computers Forensics and Electronic Textuality," in Workshop in the History of Material Texts, Vol. 4(Maryland: UMD, 2005).*
2. *Greg Smith, "Means of Production: Fabbing and Digital Art," Rhizome, March 4, 2009, http:// rhizome.org/editorial/2009/mar/4/means-of-production-fabbing-and-digital-art/ (accessed Sept 5, 2011).*
3. *Chris Anderson, "In the Next Industrial Revolution, Atoms Are the New Bits,"Wired, Jan 25, 2010, http://www.wired.com/magazine/2010/01/ff_newrevolution/ (accessed Sept 5, 2011).*
4. *Marius Watz, "Generator.x 2.0: Beyond the Screen," Generator.x, Nov 30, 2007, http://www. generatorx.no/20071130/generatorx-20-call/ (accessed Sept 5, 2011).*
5. *Mitchell Whitelaw, "After the Screen: Array Aesthetics and Transmateriality,"Proceedings of the Transdisciplinary Imaging Conference (TIIC 2010), Sydney, (2010).*

THE (RE)MEDIATION OF EXPERIENCE. A CASE STUDY

Florian Wiencek & Stephanie Sarah Lauke

In this paper we introduce our approach in (re)mediating the aesthetic experience of a video installation into a digital dispositif by developing a simulative and a transformative display model, which should highlight the experiential possibilities of the installation. Thereby our research focuses on the theoretical implications and limitations of a translation of experience and strengthens the interpretative component of these transformations.

Experience plays a crucial role in understanding video installations. Each video installation evolves a genuine relation between moving images, display and visitors. By dealing with video installations in the fields of art history and preservation, experience has to be taken into account as a result of this relation. Therefore, the approach of our case study is to introduce a dynamic notion of experience, taking into account the multimodal nature of experience in video installations. A second argument is given by the fact that aesthetic experience is subjective. Meanwhile, these fields also emphasise the necessity to register visitor-experience, although no standardised methods have been proposed so far. In the last decade, several art preservation studies have taken into account the experience of video installations (inter alia Inside Installations (2004–2007), PRACTICs (2008–2011), Mörth/Hochmayr 2008, Wolfensberger 2009, Jones/Muller 2009). These case studies reveal empirical data on visitor experience and discuss the outcome in relation to the artists' intended ideal experience. Additional, a number of documentation models on interactive video installations have been developed, some of them also involving experience (Docam Documentation Model, Capturing unstable media conceptual model and Giebeler 2009). The applied methods, such as video documentation, qualitative as well as quantitative interviews and video-cued recalls, were used from the fields of ethnology, history and social sciences. No doubt, experience is an issue both in art history and art preservation. Problems occur, when for documentation purposes access to the installation in presence is not provided anymore.

Challenges in Viewing and Translating Video Installations

Howard Besser defined in 2001 two challenges regarding electronic art, namely "the viewing problem" and "the translation problem". [1] There he addressed the fact, that devices which deliver information for different senses all become obsolete at some point and the information has to be translated into new generations of delivery devices (viewing problem), which possibly affects the meaning of the art project (translation problem). When it comes to documenting video installations, which is foremost done by photography, video or text-based descriptions, a double bind occurs: Although experience is necessary for understanding video installations, the experience itself, whether aimed by the artist or performed by the visitor, is lost in the documentation, as the experience is bound to the presence of the video installation in exhibition. Moreover, with the documentation or translation of the artwork into a digital archiveable format the information on space, the temporal components, interactivity and experiential possibilities of the installation are obscured. At the same time "[t]he relationship between the work of art, the space and the viewer's own body strongly determines the perception of the work. The

internal spatial relations and the position of an installation in space are difficult to represent two-dimensionally but are at the same time of essential importance when it comes to description and re-installation." [2] But nevertheless these archived versions of the artworks have to serve as the basis for research and education in many cases and oftentimes become a surrogate of the art project. Therefore we propose an expanded notion of art documentation by highlighting the experiential possibilities of a work and maybe allow a pseudo-experience of the work, which should come near to the real-life experience or at least create a mental representation of it.

In terms of experiencing video installations beyond their exhibition, we acknowledge case studies and generated material on the experience of video installations. However, within our case study, we want to experiment with transforming the video installation into a different media dispositif and therewith mediating the experience by the means of digital media in terms of dissemination and communication and in the same time remediating it in the sense of Bolter and Grusin. [3] The aim is to create an understanding of the possible experiences in a specific installation and to find a workable solution which can be used in everyday documentation work. Moreover, the translation should be usable in online-archives, especially enabling to re-present projects which would be difficult to access or reinstall otherwise and therewith make them better accessible for research and education.

Simulating and Transforming Visitor-Experience

Our case study consists of two phases. Phase one is an evaluation of the conceptual implications and limitations for (re)mediating the experience of video installations by the means of digital media. What are the challenges of (re)mediating experience and in which respect digital media can overcome these challenges? We aim to answer these questions by developing two display models, a simulative and a transformative display model. Hereby, we work with selected video installations, taking into account their various concepts of experience.

DISPLAY 1 – SIMULATION:

 For this simulative approach, close to the outer appearance of the installation in presence, we want to evaluate amongst others virtual reality applications such as virtual worlds or metaverses as one target dispositif. Following a paper from Narcis and Roc Parés (2006) virtual reality can be seen as a rule-based system. There exists a striking similarity to installations involving interactive elements and therefore it qualifies for this approach. [4] Moreover, metaverses enable the co-presence of visitors and therefore expand the virtual experience. We see these translated versions literally as digital re-presentations or re-installations and the presentation environment as digital display in its own right. The research project 'Inside Installations' already evaluated the use of 3D modelling for documentation purposes as "3D-techniques enable installations to be reconstructed and made accessible on the screen in such a way that researchers can obtain a much more intense experience than by studying the two- dimensional sources." [2] Following up on previous experience of the Netherlands Media Art Institute with the use of 3D models in documenting spatial artworks our research focuses more on the theoretical implications and limitations of a translation of experience and strengthens the interpretative component of these transformations in a second display approach.

DISPLAY 2 – TRANSFORMATION:

This display model uses a more transformative approach by referring to Alain Depocas' theoretical consideration "[d]ocumentation on new media art must not be a mere illustration, but rather an interpretation, an attitude. To reflect this attitude, the documentation must adopt a structure similar to its subject's." [2] First, this approach critically engages to take the real and ideal visitor-experience into account. Secondly, the notion of "adopt[ing] a structure similar to its subject's" [5] can be referred to what Rudolf Frieling in his book 'When Formats Become Form' (2005) once called 're-formatting'. The concept of re-formatting is used by Frieling to follow the specific affordances of exhibiting cinematographic or online displays, in producing for them a second or third version of the art project. Adopting this concept of re-formatting to enable visitor-experience of a video installation beyond its exhibition display provides a more flexible basis: visitor-experience is no longer reproduced or simulated within the display model, but its structure is transformed and actualised by following the specific affordances of the display-related dispositif, ideally revealing both, real and ideal visitor-experience.

These two types of display will be realised to simulate and transform a selected video installation in dispositifs different from exhibition. Following up on this test phase we will conduct an empirical study in phase two, in which we will analyse the possibilities and limitations of the displays developed. With the use of empirical methods we will evaluate, in which way the experience of the displays resembles or respectively differs from experiencing the installation in presence, and thereby overcome challenges in documentation, which we described at the beginning.

References and Notes:

1. Howard Besser, "Longevity of Electronic Art," GSE&IS Official Web Site, 2001, http://www.gseis.ucla.edu/~howard/Papers/elect-art-longevity.html (accessed November 27, 2005).
2. Gaby Wijers, "3D Documentation of Installations," Inside Installations: Preservation and Presentation of Installation Art Web Site, 2007, http://www.inside-installations.org/OCMT/mydocs/3D Documentation of Installations.pdf (accessed January 12, 2011).
3. Jay David Bolter and Richard Grusin, Remediation – Understanding New Media (Cambridge Mass., London: MIT Press, 1999).
4. Narcis Parés and Roc Parés, "Towards a Model for a Virtual Reality Experience: The Virtual Subjectiveness," in Presence: Teleoperators & Virtual Environments 15, no. 5 (2006): 524–538.
5. Alain Depocas, "Digital Preservation: Recording the Recoding – the Documentary Strategy," The Daniel Langlois Foundation Official Web Site, 2002, http://www.fondation-langlois.org/html/e/page.php?NumPage=152 (accessed November 1, 2010).

THE AESTHETICS OF PRIVATE FOOTAGE AND YOUTUBE WITHIN AVANTGARDE VIDEO ART

Paul Wiersbinski

"Video art is a subdivision of home-made video" _Vito Acconci

Looking at the early video works of fine artists in the 60s and 70s the connection to today's aesthetics in Youtube is more than obvious. Often the tapes have been documentations of performances and it is stunning to see the connecting of reoccurring standards. Today these works have become cultural classics, shaping the identity of one of the youngest art forms.

Despite the ongoing commercialization of youtube by Universal´s Channel Vevo, one of the most popular titles on the online video platform remains "Evolution of Dance" [1], which was uploaded almost five years ago and has since received over one hundred million views.

Judging this video from its purely aesthetic qualities, it is presented in a rather unprofessional manner: Its camera position and resolution as well as sound quality are modest, there is no sign of editing and the performer leaves the frame of the recorded picture at least partially on various occasions. The work's only distinguishing quality is its focus on the performer's body and action and the absence of any formal commentary.

Although one can only assume that this video's performer does not consider himself a video artist, it is still striking to see how this and the most popular works among the other consumer-created content on youtube feature many standards and conventions of artists' tapes created in the 60s and 70s: documentations of performances, use of a fixed camera (today's webcam), little or no editing, the focus on the performer and his or her body. The works of Marina Abramovic, Vito Acconci, Bruce Nauman and the Vienna actionists have by now become cultural classics, shaping the identity of one of the youngest art forms.

Technical limitations and the lack of professional training forced many of these video pioneers to compromise their works. They often produced their tapes in one shot because there was simply no way to edit the footage. On the other hand the unique aesthetic they produced originated from deliberate choices, such as the direct manner of the documentation of their performance pieces or even the attack on viewers' expectations of video as shaped by conventional cinema.

Today the average producer of homemade video footage is probably far more experienced in terms of visual consumption and has access to means of production exceeding by far the possibilities of these artists, as high definition cameras are by now included in every smartphone and free basic editing software comes with every new computer. One could therefore assume that most user-generated content would mimic popular Hollywood films or pop music videos, using fast camera movements and a high-tech editing as well as a lot of visual effects.

While many such videos do exist, they are not always particularly popular. The most obvious reasons are the economic gap between a home video and a professional MTV production and the exploitation of visual ideas by generations of innovative talents long before youtube was created. Still the question remains why videos of people dancing in their apartment or playing their favorite pop hit on a guitar receive million of hits, thus gradually entering and shaping our perception of a contemporary cultural canon. [2]

Looking at this phenomenon from an elitist perspective could lead one to initially dismiss videos featuring pretty girls, house pets or heavy reference to pop content as having no deeper cultural function apart from offering easy access to the lowest forms of entertainment and the public humiliation of others. Yet this view ultimately overlooks a crucial point in the aesthetic of many of these works, in which the performer directly faces the camera, the picture does not move and there is no sign of editing. The consistent repetition of these strict aesthetic elements suggests that these recurring phenomena have hidden function. What if million of consumers watch these clips exactly because of their minimal formal language and the consequential realistic elements within them? A viral consumer-created video is "screening the real" and therefore "functions as the screen that separates us from the Real [...] When a screen intervenes between ourselves and the Real, it always generates a notion of what is In-itself, beyond the screen (of the appearance), so that the gap between appearance and the In-itself is always-already "for us." [...] the Thing in itself is ultimately the gaze, not the perceived object."[3] Consumers sitting within their limited haptic reality stare at their often-embarrassing digital doubles exactly because they depict traumatic experience within the seemingly removed and unlimited realm of the virtual.

Images that receive such widespread attention penetrate society in various ways. Especially when private footage and recording methods suddenly become means to operate politically in public, striking similarities to video art become apparent. For instance videos produced by Osama bin Laden or suicide bombers' statements feature the exact means of aesthetic representation invented by early video artists and brought to widespread fame by youtube consumers.

According to Boris Groys these similarities occur because Islamic terrorists "have gone through the western system, have enjoyed western education, operating with western techniques and media and therefore possess a knowledge of the western symbolic economy." He also mentions the videos produced by the wardens of the Abu Ghraib prison to document their torture of Iraqi prisoners, analyzing them as symbolic answers to the threat of terrorism towards western civilization and pointing out their connection to art history: "It is extremely strange that most of the supposed sexual excesses were staged especially for photo and video recordings. They were first and foremost art – just typical contemporary art. [...] the intellectual and artistic revolt of the 60s and 70s succeeded in undermining the traditional values and the conventional dignified image of humanity in the West and exposed the truth of the acephalic, sexualized body hiding under the humanistic surface [...] American soldiers grew up in a culture in which the exposure, exhibition and derision of the human body is normal..." [4]

Another recent example in this war of images is the US government's immediate publication of private footage after the assassination of Osama bin Laden...together with a note that pornographic images where found among the captured data. The footage shows an old man kneeling and rocking in a blanket while switching the channels of a tiny TV set with a remote control. This video too is shot in the aesthetic conventions mentioned above and has attracted millions of viewers on youtube. [5] This publication not only superficially destroys the image of a man who presented himself as a dignified freedom

fighter, but also fully integrates him into the language and traditions of fine arts. After all it is easier to deal with a dead artist than with a martyr.

While video artists have further developed early aesthetics towards more sophisticated, psychological and sometimes narrative scenarios, these contemporary videos still refer to or even mock earlier products of the genre and change forms of transgression into calculated shock reactions. The early "Heidi" from 1992, for instance, represents a milestone in this shift of focus. [6]

Today's successful videos often exhibit poor quality and deliberate imperfections not out of a lack of resources but due to deliberate aesthetic considerations. Critical statements and social debates have become less important, while "shock and delight that is second to none" [7] find contemporary critical acclaim. Today's artist is "floating on the surging crests of the digital boulevards, and his sole intention seems to be enjoying the dynamic complications of hitherto unprecedented experience. Going along for the ride is a pleasure." [8]

Video art reflects both the success of its own tradition within mainstream consumer culture while at the same time longing for a transcendental field of expression. Images no longer function as an illustration of intellectual discourses, but use the visualization of "the Real […] insofar as it lacks any possible mediation and is the essential object which is not an object any longer, but this something faced with which all words cease and all categories fail". [9]

References and Notes:

 1. *youtube.com, Judson Laipply, "Evolution of Dance", April 2006*

2. *mashable.com, Ben Parr, "Top 20 YouTube and Video Memes of All Time", May 2009*

3. *egs.edu, Slavoj Zizek "The Matrix or two sides of perversion", 1999*

4. *Boris Groys, "Die Körper von Abu Ghraib" (Hamburg: Philo Fine Arts, 2008)*

5. *youtube.com, Associated Press "Pentagon Releases Videos of Osama bin Laden", May 2011*

6. *absolutearts.com, Philip Monk "Mike Kelley and Paul McCarthy: Collaborative Works", March 2000*

7. *artnews.org, "Slide Show: Nathalie Djurberg", January 2007*

8. *latimesblogs.com, Christopher Knight, "Art review: 'Ryan Trecartin: Any Ever' at MOCA Pacific Design Center", August 2010*

9. *Lacan, J., "The Seminar of Jacques Lacan: Book II" (W. W. Norton & Company, 1991)*

FLYING, SPINNING, AND BREAKING APART: LIVE VIDEO PROCESSING AND THE ALTERED SELF

Todd Winkler

When viewing our own altered image, live video processing has the ability to influence sensation, movement and expression. While artists have explored extending the body via video projection, scientists have made significant progress in understanding how we perceive and locate the body in media environments. Here, scientific research is used to examine the body in interactive video performances and installations.

Fig 1. Participant with bright reflected light filling the body
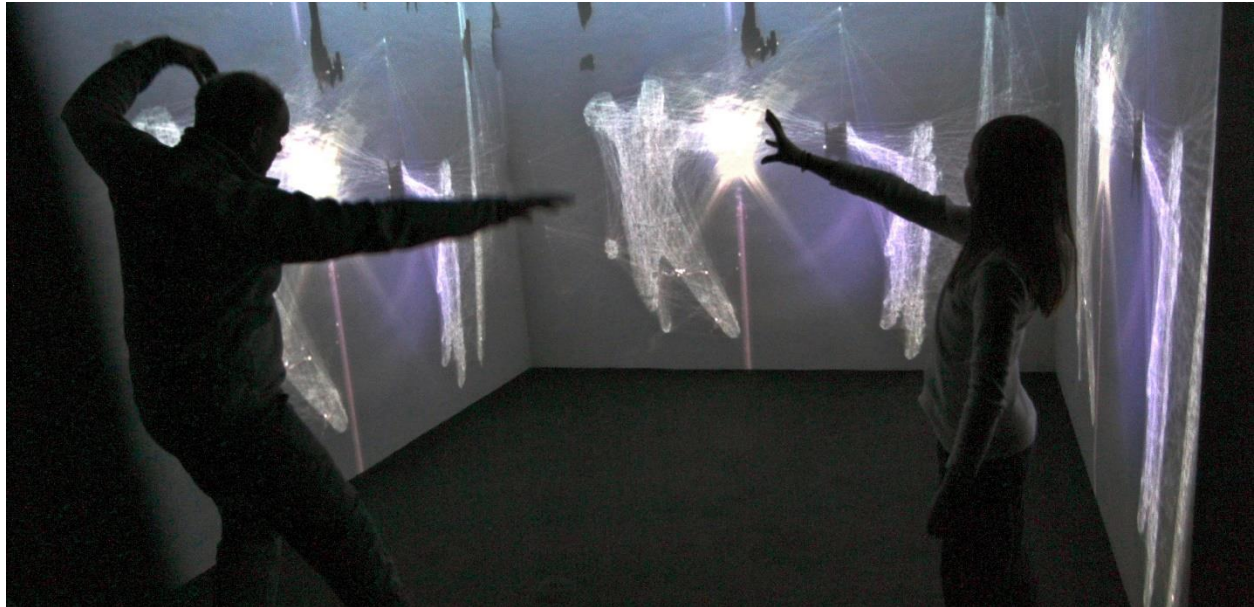
Fig 2. Two participants attached by webbing

1. Introduction

From the early sixties video synthesizers, to recent iPad2 apps, people have always been fascinated with fantastically altered versions of themselves. As real time video representation of the body becomes more and more common through video chat and teleconferencing, some people will want to exert creative control over their image. And although the video image is wholly constructed with digital data, and therefore capable of infinite manipulation, it is tethered to a live human being. No matter how abstract the image becomes, its gestures are not that of an algorithm, but a spontaneously acting person –the language and expression of a moving, sensing body. However, video processing is not "neutral," it changes our perception, which can be keenly observed when viewing an altered version of our selves.

This paper draws from recent studies in cognitive science, and observations from the past fifteen years of the author's creative work in dance and installation to examine the experience of live video processing and the body. In these artworks, scale is important;the projections are approximately life size to act as a mirror to reflect back the participants' movements. Whole body movements are also important; the participant is fully engaged with freedom of movement, a sense of balance, and kinesthetic response. While theses works deal with the translation of the physical to the digital, what is most interesting is the feedback loop back: the digital image alters both human movement and sensation, which, in turn, alters the processed image. Viewers tend to imitate their altered image, finding a limited repertoire of movement that "resonates" with their digital double. They often report a feeling of immersion or presence within the video image.

How do these processed images add new knowledge of our selves? How do we "feel" when observing our bodies extended, warped, colored or delayed in time? How are group dynamics affected when people find themselves interacting with others in the same altered world? Video processing adds new information, changing the meaning and perception of our own image.

In previous work using movement-activated sound for dance and installations, I noticed a strong intuitive tendency for participants to use gestures that match the physical quality of the sound. For example, high impact sounds caused by breaking or hitting, would elicit sharp, quick movements, while quieter ambient sounds would suggest longer sweeps with the limps. Thus, participants' efforts are closely aligned with imagined physical forces required to make the sounds.

In a similar way, live video processing suggests forces that influence participants' movements and feelings in their body. People attune to their altered image, just as they attune to each other. One collaborator, dance artist Cindy Cummings, described her performances with her altered video double as "a contact improvisation with an alien version of my self," each being mutually influential.

Each video process suggests to the viewer a new kinesthetic vocabulary as they view their own body in real time, flying, spinning, or breaking apart. When disruptions are reflected back to the participant, it creates a dynamic interaction that fuses the physical body with its electronic extension. As we will see, these boundaries are often quite blurred.

In an attempt to further understand the experience of being digitally transformed, I have been pulled into some inspiring research in cognitive science dealing with presence and movement. Although I am not a scientist, I have found support and insight for my artistic hunches, gained from personal experience and from conversations with others. I hope it will be helpful to summarize some of the relevant research here, in a very condensed form, while taking some license to speculate on its potential for understanding the experience of participants immersed in a reflective, digitally altered experience.

2. Presence and Perception in the Mirror

Although much has been written about embodiment in virtual reality and telematic systems, a special case can be made for artwork dealing with "video mirrors," where there is a deliberate relationship created with a participant and their video double. Unlike telepresence, which can be tricky to connect with another individual or correctly locate the body, we immediately and intuitively know and believe that our reflected image IS our body. We are real in two places.

To fully examine our embodied experience in these situations, along with the physical (objective) body and the virtual body, we must consider the body image and the body schema. While the body image deals with perceptions, beliefs and attitudes about thebody (a huge subject beyond the scope of this paper), the body schema deals with the, mostly unconscious, internal representation of the body that controls posture, movement and location in space.

How do we reconcile the discrepancy between the location of our physical and virtual body? Research shows that our body schema does not always correspond with our physical body.

3. Body Ownership – Where is the Self?

"Our bodies seem to be infinitely mutable, while they never ceased to be our bodies." - Susan Kozel [1]

Botvnick and Cohen's discovery of the "Rubber Hand Illusion" in 1998 opened up a rich vein of ongoing scientific research on body schema. [2] In the original experiment, a fake hand was placed on a table in front of a participant, while the real hand was hidden from view. When the index fingers of the real and fake hands were touched simultaneously, the participants attributed the location of touch to the rubber hand, identifying it as their own. They key finding is that the physical body is falsely located – *the self is located where touch is seen.*

A slew of experiments have repeated this effect, with infinite variation. Several researchers have shown that virtual limbs and whole bodies in virtual reality systems can be "owned;" when simultaneous touch is introduced, participants (falsely) locate their bodies in the virtual environment. One study showed the promise of producing unusual sensations in the body by addressing physical orientation and visual perspective. Participants felt sensations of floating by seeing a video of their prone bodies above where they were actually lying. [3] Visual realism of the hand or body did not seem to play an important role, and anything recognized as a body or a hand seemed to be an acceptable substitute. [4] This identification with body morphology suggests why people identify highly altered video images as themselves.

In these experiments, vision locates the body, and touch proves it. What is especially relevant to artists, however, are findings that free movement, or action can have a similar effect, with more unified results. One study concludes, "Sensory mechanisms generate a sense of body ownership based on fragmented local representation of individual body parts, but action provides a coherent sense of bodily self." [5]

Even though much of this research deals with a first-person perspective, I believe it helps to explain some of the powerful effects of unencumbered whole-body movement within reflective video installations. These works combine action with sensation: feeling the pressure on the feet, a sense of balance, proprioception, kinesthetic response, or the touch of a friend's hand – all of this would go towards making participants feel that their body was both in physical space, and believably in the projected space. The physical exertions, effort, pain, balance, and other sensations one experiences from the physical body, also seem to emanate from the projected body.

Participants most often confirm their on-screen existence by waving their hand and seeing an immediate result. If they have come with a companion, they often try to touch each other in the virtual world. Synchronization is key to the mislocation of the body. Even small time delays may disrupt the effect, although video delay can offer a different kind of uncanny feeling, being in both the present and the past.

In my own experience viewing my altered double, I locate myself simultaneously in both my physical body and in the projection. It is not an either/or situation, but rather, a continuum from being fully in my own body and simply observing patterns of projected light, to feeling fully immersed, present and engulfed by the projected space. Most of this has to do with attention. In virtual reality environments, for example, very little attention is on the physical space, as we can't see our physical body or the room. On the other hand, "mixed reality" installations, such as those referenced here, usually attempt to minimize outside sounds and maintain visual focus by clearing the room of objects, and having the projection(s) as the sole visual material. The continuum of body location would be more balanced in these situations, and may change with the participant's focus.

4. Identifying Movement and Self-Recognition

Video processing can color, bend, warp and distort images to the point of abstraction and unrecognizability. However, we have a great ability for recognizing human movement, even from the most minimal of detail. Numerous perception experiments that abstract the moving body image to just a few "point lights" (illuminated dots representing the joints of the body) reveal that the distinctive timing, articulation and pathways of human movement are easily recognizable. Even when further distorted by masking, timing or viewing angle, the human form in motion is still visible. Point-light experiments have also shown the inherent "readability" of the expressive body, with our ability to recognize such things as gender, intent and emotions solely from abstracted movement information. [6] I would speculate that with more information, such as that provided by a silhouette, the reading of emotion and meaning is further enhanced.

We have a heightened sensitivity to self-identification in point-light images. Despite the fact that we rarely see ourselves moving, except the occasional look in the mirror, we are able to identify ourselves in a highly reduced point-source image, much more readily than even the abstracted image of a good friend (with whom we have much more experience viewing). We show the highest ability to recognize our own free and expressive movements, such as dance, rather than pedestrian movement. This suggests that our own kinesthetic experience contributes to the visual analysis and perception of movement. [7]

This helps us understand why, even in live video projects where the body is highly distorted, the viewers will recognize and "feel" the familiar rhythm of their own bodies, which will lead them to identify the new image as "me." Even a literal faint glimmer of the body's movement can result in self-recognition, as in a scene from the author's installation "Entanglement Witness," where the audience's body appears only as a subtle play of light filtered through autumn leaves.

5. Social Interaction and the Loss of Self

"Synchronous multisensory stimulation blurred self-other conceptual boundaries even when the perceived other was a total stranger." - Maria-Paola Paladino [8]

Once a second person enters an installation, everything changes. We are highly social creatures – there is nothing more interesting to one human being than another! A participant's experience of the artwork immediately undergoes a highly complex and rich transformation with the inclusion of other people. Live video processing can foster empathy while breaking down the barriers between the self and others. In abstraction, the face is often obscured, or not readable at all in the case of silhouettes, and the details of the body and clothing are missing, allowing many people to experience a liberating loss of self-consciousness. Various problems with eye contact, camera angle and gaze are eliminated. Everyone is in the same "boat" and appears to be made of similar material. As was previously mentioned, the morphology of the body seems to be most significant and this may lead to multiple participants having a feeling of embodiment with their altered image or possibly with others. The focus then turns to the expressive movement of the body, in social interaction with real and "virtual" people, all responsive in real time. The abstract body is still highly expressive, and people will read these images as having emotions, intentions, and personality traits.

I have frequently seen a playful connection and merging with others in my video installations. Some multisensory researchers come to similar conclusions, noting that many interactive social situations present all of the elements for a loss of the real body and loss of self. [9] Others show how sharing embodied experiences enhances social cohesion, and heightens our awareness of similarities between individuals, rather than superficial differences. [10] From a purely sensory experience, subjects felt closer and more positive towards strangers, with a high degree of "self-other overlap," which is typically experienced with close friends and family. [8]

6. *Glint*: Movement and Meaning in the Abstract Body

"*The human visual system appears to be well tuned for the detection of both physical and social characteristics of the human body in motion.*" - Maggie Shiffrar [6]

Glint is the title of my recent audio/video installation where viewers see their projected life-size silhouettes filled with various video images and video processes. The specially built room has large projections filling three walls, with an infrared camera used to capture participants' silhouettes. A hypnotic soundtrack assists in pulling viewers in to a more complete and immersive world. In one section, viewers reported feelings of movement and unsteadiness when seeing their bodies filled with moving water. The discrepancy between their real body on solid ground, and their flowing virtual body, often made them loosen their limbs and sway in sympathetic movements with their video double. If the "Chameleon Effect" has shown that people unconsciously imitate each others behaviors, and if mirror neurons are known to fire in a similar pattern when someone acts or simply watches another act, then isn't it possible, and perhaps likely, to have a similar unconscious imitative response seeing a highly modified version of ourselves?

In another section of *Glint*, bodies are filled with sunlight reflected off water, which resulted in several people reporting a feeling of warmth over their entire body, or specifically where the brightest light touched their body (Figure 1). In these examples, proprioception and sensation were both influenced by the video image, with reports of people feeling simultaneously within and outside of their physical body.

The installation is often experienced as quite meditative and calming with a single participant, although some did report feeling uneasy being isolated in a darkened room with only a strange version of themselves for company. (An artist of a different ilk might choose more disturbing images playing inside the body, which could illicit deep fear or revulsion.)

To enhance and literally represent social cohesion, a special effect is activated when there is more than one participant; a fine webbing attaches to the extremities of two or more silhouettes when they get close (within 3 feet), shooting out from one body to connect with and touch another (Figure 2). Sometimes traces of the body are left visible on screen, like a living painting that pulls the viewers more deeply into the virtual world.

With the loss of physical detail that might create a feeling of separation or body self-consciousness, participants notice their similarity and connection with other freely moving, and sensing, virtual bodies. The relationships are complex: people isolated with friends or strangers in a darkened room, a feeling of being in two bodies at once, the location or mislocation of sensation, the intense images of flowing water or light, and the overlap and interaction with real and virtual bodies.

7. Conclusion

Although I make no claims of the scientific accuracy of my musings, it is inspiring to find scientific discoveries that corroborate and shed light on artistic speculation. An expanded definition of the self, physical and emotional transformation, and merging with others – these are timeless themes in art that technology and science promise to extend; from the audience's imagination to an immersive, multisensory experience.

References and Notes:

1. *S. Kozel, Closer: Performance, Technologies, Phenomenology (Cambridge, MA: MIT Press, 2007), 108-109.*
2. *M. Botvinick and J. Cohen, "Rubber Hands 'Feel' Touch that Eyes See," in Nature 391, no. 6669 (1998): 756.*
3. *B. Lenggenhager, M. Mouthon and O. Blanke, "Spatial Aspects of Bodily Self-consciousness," in Consciousness and Cognition 18, no. 1 (2009): 110-117.*
4. *M. Slater, D. Perez-Marcos, H. Ehrsson, and M. Sanchez-Vives, "Inducing Illusory Ownership of a Virtual Body," in Frontiers in Neuroscience 3, no. 2 (2009): 214-220.*
5. *M. Tsakiris, G. Prabhu, and P. Haggard, "Having a Body Versus Moving Your Body: How Agency Structures Body-Ownership," in Conscious and Cognition 15, no. 2 (2006): 423-432.*
6. *M. Shiffrar, "People Watching: Visual, Motor, and Social Processes in the Perception of Human Movement," in Cognitive Science 2, no. 1 (2011): 68-78.*
7. *F. Loula, S. Prasad, K. Harber, and M. Shiffrar, "Recognizing People from Their Movement," in Journal of Experimental Psychology: Human Perception and Performance 31, no.1 (2005): 210-220.*
8. *M. Paladino, M. Mazzurega, F. Pavani, and T. Schubert, "Synchronous Multisensory Stimulation Blurs Self-Other Boundaries," in Psychological Science 21, no. 9 (2010): 1202-1207.*
9. *M. Tsakiris, "Looking for Myself: Current Multisensory Input Alters Self-Face Recognition," in PloS One 3, no. 12 (2008): e4040.*
10. *M. Longo, F. Schuur, M. Kammers, M. Tsakiris, and P. Haggard, "Self Awareness and the Body Image," in Acta Psycholica 132, no. 2 (2009): 166-172.*

MOTION IN PLACE PLATFORM: VIRTUAL (RE)PRESENTATIONS OF IRON AGE MOVEMENT

Kirk Woolford & Stuart Dunn

Over centuries, societies have built up a wealth of written knowledge of human behaviour and emotion in response to specific sites. Such narratives are, however, subjective and not necessarily quantifiable. At the same time, the physical study of a site or the cataloguing of material objects falls short of capturing the human experience of a site. MiPP is developing technologies and research strategies to understand a site by moving through it.

Figure 1: Capturing Archeologists working on site in Silchester.

Figure 2: Live, Augmented Reality rendering of Silchester Roundhouse and Iron Age inhabitant.

Figure 3: Live capture in a re-constructed roundhouse at Butser.

Understanding Human Movement

Explorations of relationships between human movement and places, sites, or locations, are frequent components of research in archeology and anthropology. However, as ever more of our culture is digitised, disciplines including architecture, cultural studies, natural and built environment studies, performance, and others, are re-discovering transdisciplinary notions of site and embodied experience of place. They are broadening their research from studies of purely material cultures of roads, paths, and buildings to encompass the experiences and social relationships for which these were constructed. When members of UNESCO developed their definition of Intangible Cultural Heritage they looked at Rangihiroa Panoho's example of the marae, as simultaneously a building and a cultural meeting space for the Maori. It functioned along the lines of what Joseph Roach calls "vortices of behaviour": churches, marketplaces, theatres, schools, and kitchens in which certain kinds of behaviours and values are learned and certain memories are transmitted. [1] These sites are often documented by researchers using traditional research tools including cameras, GPS loggers, etc, but the behaviour, the embodied experience of the place is lost.

Architects long ago realised that it is not possible to get a proper understanding of a location by simply looking at drawings or images; that we need to move around a building in order to understand it. Traditionally, they would build 3D models to allow people to look at places from different viewpoints. Recently, many have turned to digital models and techniques enabling virtual fly-throughs, yet these digital resources cannot replace embodied understanding of place. Architects continue to "walk the site" or, rather, plot out the site on the ground and walk through it with an understanding that movement alone allows them to comprehend scales, orientations, and relationships. Similarly, the importance of an explorer's bodily involvement with the objects of scientific investigation is increasingly, explicitly, acknowledged in current archaeological theory. With the steady growth of interactive virtual environments, architects, geographers, anthropologists, performing and visual artists, and human-computer interface specialists are increasingly dealing with Mashiro Mori's "uncanny valley" where as depictions of motion come closer to human, emotional responses become increasingly positive and empathic, until a point is reached beyond which the response quickly becomes that of strong repulsion. [2]

The interdisciplinary Motion in Place Platform (MiPP) consortium aims to move beyond traditional studio-bound motion capture to ask how capturing humans' movements through sites can lead to new forms of research data to reinforce understandings of how places were/are used rather than focusing primarily on how they are constructed.

Case Study: 3D Movement (Re)Presentation in Iron Age Briton

It is paradoxical that the one thing which most visual 3D representations of the human past lack is humans. The most obvious reason for this is that buildings, features and artefacts can be reconstructed (whether digitally or not) from empirical archaeological remains, whereas there is far less direct evidence for how people would have looked and moved. Clothing, of course, can be reconstructed from historical or art-historical evidence, but such indications are lacking for many periods and cultures. This is surely a limitation on the application of 3D reconstruction, both as a tool for archaeological research and as means of presenting cultural heritage to the public. In a footnote Mark Gillings states: '[I]t is worth noting that one of the most striking things about archaeological Virtual-models is the lack of people in them. As a result, wandering around re-creations such as Virtual-Stonehenge can be a ghostly and unsettling experience.' [3] It should also be noted that such previous research as has been done on this

area has typically focused on what might be termed 'extra-ordinary' activities, such as ritual. [4] There remains a lack of consideration and theory of how day-to-day practices can be visualized and presented as products of human activity.

Archaeological evidence is, and always has been, primarily about material, and about what the process of human existence has left in the ground for us to find and document empirically. Experimental archaeology seeks to evaluate the methods (although not necessarily the tools) used to create features such as buildings and artefacts, such as arrowheads, with the evaluations derived from empirical evidence. [5] Careful observation and recording of the construction and creation processes can lead to new insights in to how buildings and artefacts were created, and in some cases can help explain anomalous or unusual features in the material record.

In its initial development phase of the project, the MiPP researchers worked directly with Michael Fulford's team from the University of Reading during their Summer 2010 excavation of the Silchester Roman Town. [6] The Reading team at Silchester has a strong history of acting as a testbed for digital technologies in the field through it's hosting of the Virtual Environments for Research in Arts (VERA) project. As such, the Silchester team provided infra-structural support for the first on-site motion capture trials. In order to obtain initial test data, the MiPP team captured the movement of the archeologists as they worked on the site (see figure 1), and has made this data available to archeologists at Reading, Southampton and other universities. At this phase of excavation, evidence was emerging of an earlier Iron Age town on the Silchester site including a clear circular impression which hypothesised to have been the wall of a roundhouse. As more evidence of an Iron Age town arose, the MiPP team focused on how their systems could be used to understand the daily life in an Iron Age roundhouse, what were the movements of Iron Age people on the same location and how could an understanding of their motions help to understand the emerging archeological evidence. In collaboration with the Silchester archeological team, a model of the roundhouse and was illustrated, modeled and textured using Autodesk Maya. These models were imported into the Unity3D game engine to allow them to be animated and explored.

Given that round houses were domestic settings, we determined that the actions to be generated to populate this virtual roundhouse should be day-to-day activities, with the actions, themselves, being based as far as possible on available evidence from archeological records. The first step in this process was to develop 3D character models to simulate the activities of human agents. Utilising Zbrush and Maya, characters were modelled and rigged. In order to correctly constrain these activities spatially, an area of floor space in a studio at the University of Bedford was taped out with dimensions equivalent to the Silchester round house. Two dancers and a choreographer were then asked to explore and participate in the type of tasks that might have been performed during the daily activities of inhabitants while wearing Animazoo IGS190 inertial motion capture suits. Motion from the suits was mapped, in real-time, into the virtual 3D round house using Unity3D and a suite of software tools developed as part of the eMove project: a joint research project between Sussex informatics department and Animazoo (http://www.mocapsuit.com, last accessed 29th Aug 2011). The data was simultaneously saved in Biovision Hierarchy (bvh) format, so the resulting motion data could be subsequently analysed and/or attached to a character model for further animation.

The dancers decided to (re)present "household actions" including sweeping, cooking and lifting water from a well. When the handling of water led to numerous discussions about whether water would have been stored in the building, fetched from a well or other source, how it was carried, how it was used, etc., the Mipp team consulted published souces about daily activities in Iron Age Britain, [7] but the Reading archaeologists suggested contacting the experimental archaeology lab of Butser Ancient Farm,

where further capture sessions were conducted with another group of dancers and the Butser archeologists, themselves (see figure 3).

Experimental archaeology seeks to evaluate the methods (although not necessarily the tools) used to create features such as buildings and artefacts, such as arrowheads, with the evaluations derived from empirical evidence. Careful observation and recording of the construction and creation processes can lead to new insights in to how buildings and artefacts were created, and in some cases can help explain anomalous or unusual features in the material record. For, example the presence of curved depressions in the ground near the structure of the round house at Pimperne Down, Dorset, had no apparent function or relationship with the building whatsoever. In the process of reconstructing this round house at the Butser Ancient Farm experimental archaeology site, it was found that such depressions are made when manoeuvring the structure's roof beams in to place. [7]

Motion Assumptions

Alongside the development of technologies and platforms which support the (re)creation of ancient environments in 3D has been a marked increase in the availability, affordability and robustness of 3D motion capture apparatti. Data derived from motion capture can take numerous forms. These can be classified, after Moeslund et al. [8], in to broad categories of surveillance, control and analysis. Surveillance is the observation of the behaviour of individuals and/or crowds; for example for public order at sports grounds. Control is where a human uses a piece of hardware to direct action in a virtual environment (such as a game). Analysis is where motion capture is used to build and/or augment other forms of information, particularly the annotation of video and motion traces. The simulation and documentation of various human activities that were (or may have been) carried out in and around both past and present environments falls chiefly in to the category of analysis.

While this has been investigated previously, many such approaches are purely representational, tending to avoid the pressures that integration of motion capture data with 3D environments places on interpretation. During the capture process, we became aware that we were making numerous assumptions about motion which we needed to record in order to provide a context for our motion data. For example, when capturing in the studio, we became aware of how much the hard floor and dancer's shoes constrained the movement, so we replicated the motions barefoot, outdoors on uneven, grass. We realised how much external factors such as footware, clothing, training, age and gender of the mover impacted the motion data. Many assumptions of this kind are implicitly encoded into virtual 3D models, of which the round house we produced is an example. While we cannot remove such assumptions from the reception and transmission of VR environments, our motion capture trials using the model have allowed us to begin to isolate and critically assess them. It became clear that one key factor missing from our reconstruction of the hypothetical tasks is the ability to annotate and describe the motion data objects. The key difference between the kind of 'human factor' representations and re-enactments that are currently viewed with suspicion by experimental archaeologists is that digital capture should allow particular actions, and particular temporal points in each trace, to be labelled with a) what material evidence relates to each action or trace or, if there is no material evidence, what that action has been represented.

Conclusion

MiPP seeks to replicate, contemporaneously, the actions that the evidence suggest was carried out in a round house, document those using motion capture technologies, and integrate that documentation within the reconstruction. The approach has the potential to bring to life not only the round house, but the hypothesized activities of its inhabitants. The MiPP team is just beginning to explore the use of Augmented Reality techniques for overlaying (re)recreations and dynamic visual interpretations on the exiting site (see figure 2). It is hoped that these techniques will allow close links between site and activities movement by visually combining them. The theoretical questions this raises about how 3D visualization can – and the degree to which it should – impact on our perception of the ancient world are far-reaching. Archaeology is fundamentally about the material record: tracing what has survived in the soil, and building theories top of that. Since the eighteenth century, Britain's museums have operated on, and extended, the same principle: they are polished presentations of the 'final' material record. However, many of our theories concern what people did, and where and how they moved while they were doing. We have reconstructed in a practical and agentive way how certain everyday tasks might have been accomplished by the Iron Age inhabitants, and further development of the project will seek to refine and formalize the evidence framework in which this rests. As far as we are aware, this is the first attempt to link, explicitly, a remediated VR with the 'real world' by human agency, as represented by empirical motion capture data. In this paper, we have attempted to set out the limitations that undoubtedly exist in reconstructing and visualizing human agency but believe that, within those limitations, this approach has a valuable contribution to make to the development of virtual models for Arts and Humaities research and understanding and experiencing locations, sites or "places".

Acknowledgements

For more information, please see http://www.motioninplace.org

References and Notes:

1. Joseph Roach, *Cities of the Dead: Circum-Atlantic Performance* (New York:Columbia University Press, 1996), 26–28.
2. Masahiro Mori, "The Uncanny Valley," in *Energy* 7, no. 4 (1970): 33-35
3. M. Gillings, "Engaging Place: A Framework for the Integration and Realisation of Virtual-reality Approaches in Archaeology," in *Archaeology in the Age of the Internet - CAA 97 - Computer Applications and Quantitative Methods in Archaeology: Proceedings of the 25th Anniversary Conference, University of Birmingham, April 1997*, eds. L. Dingwall, S. Exon, and V. Gaffney, 247-254 (Oxford: Archeopress, 1999).
4. D. Farvo, and C. Johanson, "Death in Motion: Funeral Processions in the Roman Forum," in *Journal of the Society of Architectural Historians* 69,no. 1 (2010): 12-37.
5. J. M. Coles, *Experimental Archaeology* (London: Academic Press, 1979).
6. A. Clarke, M. G. Fulford, M. Rains, and K. Tootell, "Silchester Roman Town Insula IX: The Development of an Urban Property c. AD 40-50 - c. AD 250," in *Internet Archaeology*, no. 21 (2007), http://intarch.ac.uk/journal/issue21/silchester_toc.html (accessed August 29, 2011).
7. P. Reynolds, "Experimental Reconstruction" in *An Iron Age Settlement in Dorset: Excavations and Reconstruction, Monograph 1* (Edinburgh: Edinburgh University Press, 1993).
8. T. B. Moeslund, A. Hiltonb, V. Krüger, "A Survey of Advances in Vision-based Human Motion Capture and Analysis," in *Computer Vision and Image Understanding* 104, no. 2-3 (2006): 90-126.

SKY KNOWLEDGE: THE SQUARE KILOMETRE ARRAY (SKA) AS A FOCUS FOR ART-SCIENCE COLLABORATIONS

Suzette Worden

Radio astronomy is being developed globally through the Square Kilometre Array (SKA) project. The decision for its location, either in Southern Africa or Australia, is expected in 2012 with construction from 2014 to 2024. How will the SKA be understood by broad audiences beyond the scientific community? This paper examines the potential of the SKA as a catalyst for art-science conversations and collaborative projects.

Ilgarijiri: 'Things belonging to the Sky'. Photo © John Goldsmith, ICRAR
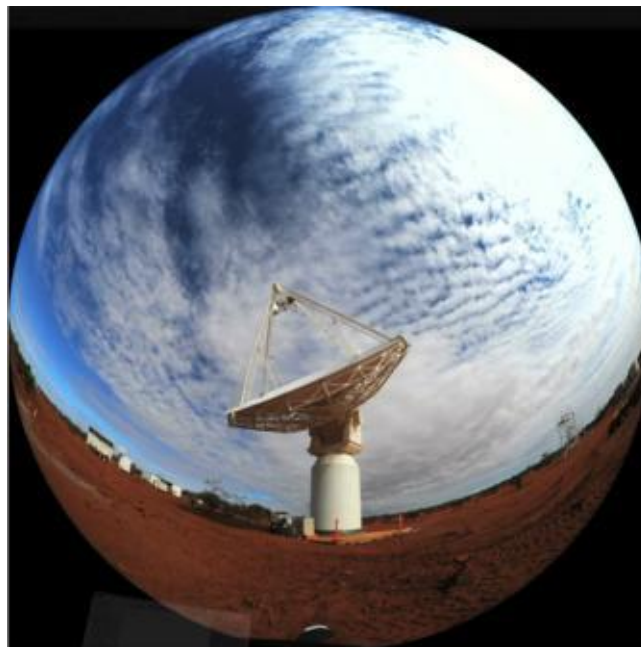
ASKAP Fisheye Photography. Photo © Paul Bourne iVEC@UWA with Jonathan Knispel

Introduction

 The Square Kilometre Array (SKA) will be an array of dishes and antennas, which together form an enormous radio telescope. Collecting data from radio waves that can penetrate through cosmic dust, allows astronomers to study the centre of our galaxy. The SKA will extend current capabilities and enable astronomers to look into the past at the history of the Universe. Current developments towards this goal include the building of the Australian SKA Pathfinder (ASKAP) in Western Australia and the MeerKAT in Southern Africa. These telescopes will trial new technologies for the international SKA design.

The project is gaining momentum; it is therefore timely to see how the potential benefits are being communicated and appreciated beyond the scientific community, or how those involved in the development of the SKA are building cultural links with others interested in, or affected by, its development. In this paper I will explore how the SKA is portrayed, especially in art-science conversations and collaborations.

Radio astronomy has been the subject of artworks and a focus for theoretical discussion, as in Astronymous: Leonardo Art and Astrophysics Working Group. Examples of works include 'Radio Astronomy' (2004), a project by Radioqualia, devised by Honor Hagar; 'Deep Space' (2006) by Hellen Sky with Paul Bourke; 'Void Love' (2008-2009), a web-based soap opera by Nicky Forster and Willoh Weiland, with Dr Chris Fluke, Centre for Astrophysics and Supercomputing, Swinburne University, Australia; and 'Beam Me Up,' by the German group, Xcult, an online exhibition with guided tours curated by guest curators as part of the 2009 Year of Astronomy. The International Year of Astronomy in 2009 was a catalyst for work in this area. Examples of activities from Australia included star hunt programmes, commemorative coins, and travelling exhibitions from The World at Night (TWAN) photographers group.

Related areas of astronomy and space travel have been explored through artist in residence schemes, including NASA's residencies which started in 1962 (NASA 2009). Planetariums are important places for visual displays of the night sky. The aesthetics of these displays owe a great deal to the pioneering work of artist Donna Cox. Planetariums have also provided a venue for creative works such as 'Celestial Mechanics' (2005), a planetarium-based artwork installation devised by Gabriel Dunne and Scott Hessels. The 'Space, About a Dream' exhibition (Kunsthalle, Wein, April to August 2011) celebrated Yuri Gagarin's space flight. There is therefore a significant body of art works, in traditional media and electronic formats, demonstrating popular cultural interest in space exploration, through telescopes and by space flight.

Against this background of creative responses to the subject of astronomy, I will consider two examples of the exploration of aesthetics and creativity relating to the SKA that are associated with the physical site for the Australian SKA Pathfinder (ASKAP) in Western Australia. One provides the context for discussing the physical site and engagement with the traditional owners of the land, where a fully functioning SKA could be built in Western Australia. The other concerns how the SKA is being visualised *and* depicted using digital technologies. Images from both of these examples are becoming popular representations of this globally significant scientific and technological development. This commentary will provide the starting-point for suggestions about the characteristics of further art-science collaborations.

The Square Kilometre Array (SKA)

The Square Kilometre Array (SKA) project is going to give scientists unique opportunities to study the formation of the early Universe. The SKA will be the world's largest radio telescope and is the focus of a

project started in 1993 when the International Union of Radio Science (URSI) established a Large Tele-scope Working Group. After a period of growth and consolidation the project now comprises an international partnership between 67 organisations in 20 countries. In April 2011 the Jodrell Bank Observatory, Manchester, UK, was selected as the host Project Office and a Founding Board established for organising the next phase of development of what is now terms a 'mega-science' project with €1.5 billion funding.

The decision for the final site will be made in 2012. The sites under consideration are in Southern Africa, with extensions to the Indian Ocean Islands, or Australia, with extensions to New Zealand. From the central area an array of antennae will spiral out to cover 3000 kilometres or more. The criteria being used to evaluate these sites include the availability of radio quiet zones, characteristics of the atmosphere, climate, infrastructure, maintenance and operational costs. There will be a pre-construction phase from 2013-2015 and then two phases of construction (2016-2019 and 2018-2023) followed by full science observations from phase one in 2020 and phase two in 2024. When the SKA is operating, sensitivity of telescopes will be 50 times and the survey speed 10,000 times that of current equipment. [1] The data will be used by the scientific community to explore fundamental unanswered questions about the formation of stars and black holes, the evolution of galaxies, and existence of magnetic fields. Researchers will also investigate gravity to ask further questions about the theory of general relativity and seek to detect extra-terrestrial signals, and search for amino acids to detect forms of life or places where life might be supported. These questions are of interest to others beyond the scientific communities and have been investigated by artists, individually or as part of a collaboration with scientists.

Ilgarijiri: 'things belonging to the sky'

A project directly related to the SKA in Western Australia was Ilgarijiri, meaning 'things belonging to the sky' in the Wajarri language. This was a joint project between Professor Steven Tingay and colleagues, from Curtin University and the International Centre for Radio Astronomy Research (ICRAR) and staff and artists of Yamaji Art, Geraldton, Western Australia. The project explored the connections between Aboriginal astronomy and the astronomy associated with the SKA. These artists live in the region of the proposed location of the SKA. Radio astronomers from Curtin University spent time with the Yamaji artists and shared stories, scientific and traditional, about the way they observed nature and the sky. Work by the Yamaji artists, resulting from these conversations and a visit to Mullewa and Boolardy Station, was exhibited in Geraldton Western Australia in June 2009 and then at the University in Perth, Western Australia in October 2009. The work also went to the Australian Institute for Aboriginal and Torres Strait Islander Studies (AIATSIS), in Canberra, and was on view from November 2009 to January 2010. The work was also shown internationally as part of a 'Communicating Astronomy with the Public' conference, held in Cape Town in 2010.

Paintings from the exhibition bring to life stories from indigenous astronomy. [2] For example, a painting by Margaret Whitehurst, 'Emu in the Sky' shows the Emu representing the dark space in the Milky Way that is recognised for its 'emu' shape. The emu's head is near the Southern Cross and its body and legs are dark areas that reach towards the Milky Way in the direction of the constellation of Scorpius, in the southern night sky. The greater visibility of the emu, from May to September, was a sign to hunt for emu eggs, a welcome food for the community. Radio astronomers comment on the relationship between this recognition of the dark spaces in the sky, as opposed to the stars, and their exploration of space through radio waves. As well as recognising the different ways of interpreting the sky, similarities were noted about recognition of visible and invisible parts of the spectrum.

The exhibited paintings gave audiences a view of the richness afforded through observing the night sky and ways of relating the changes in the sky to everyday living patterns and the seasons. The sharing of knowledge was a conversation, with the Yamaji artists embracing ideas from the trip to see the possible location for the new equipment for radio astronomy, as some of the paintings in the exhibition are also a record of that journey to the possible site of the SKA. For the astronomers and the exhibition audience there are opportunities to embrace views of the cosmos with a long and enduring timespan of development. There were also opportunities to work with the local community and collect video documentation of stories about the paintings. Through the project the scientists were able to connect with the traditional owners in the local community where the proposed SKA would be built. The science was therefore contextualised within a social context that embraced the location of the ASKAP. Direct economic benefit also came to the indigenous community through the sale of works from the exhibition and ongoing publicity through a website, TV and press coverage. [3]

The ASKAP project is bringing economic change to the remote area. The Ilgarijiri project is making important educational and cultural links, especially between art and science. It is also providing a context within which to understand our appreciation and reactions to remoteness in an increasingly populated and networked world. For radio astronomers to collect data about the universe radio-quiet locations are needed. Landscapes and environments in a remote location on Earth is being associated with the gathering of information from even more remote locations and across immense distances. In a globally shrinking networked world we are still challenged and excited by the immensity of physical space. As a counterpoint to this demonstration of remoteness and distance, the Ilgarijiri project interestingly demonstrates connections across time. Links are being made between the indigenous knowledge, from a diverse culture with many different groups, to the scientific activities and engagement in a global research project developing new technologies to see back though time and ask questions about the evolution of the Universe.

Scientific Visualisation and the SKA

The SKA is being publicised internationally through a promotional animation that is freely available for viewing along with other images and resources available for downloading for educational purposes. [4] The promotional animation was produced by the 3D Productions Group attached to the Centre for Astrophysics and Supercomputing at Swinburne University of Technology, Melbourne, Australia. The movie takes viewers on a fly-over tour of the site showing the three different kinds of telescope array, followed by a depiction of the scale of the enterprise when it is finished. The animation has to represent a site that has not yet been chosen.

The group has also produced a promotional animation movie for the ASKAP, which takes the viewer through a scene where the telescopes are shown in a visualisation of the Murchison terrain against the backdrop of a rapidly changing sky, from sunrise, through daytime and night time. The smooth movements of the telescopes are shown against the silhouettes of vegetation, depicting a vegetated but otherwise sparse and empty environment. As a viewer we 'fly' over this landscape, as if in a plane, able to see but not touch.

The ASKAP project has provided an interesting subject for experimentation in visualisation. In 2010 Paul Bourke and Jonathan Knispel created visualisations of the Pathfinder on the Boolardy station. [5] As the designs for the SKA telescopes are still being developed, the visualisations, such as these that are in circulation, are integral to the communication process within the project as a whole. In addition the images

are beginning to circulate as part of outreach and public communication side of the project. The images developed by Paul Bourke are also experiments for testing the latest technologies for high resolution gigapixel images, movies, fisheye images, files for Google Earth and Fulldome productions.

In these examples there is reference to 'realism' in so far as the digital technologies being used are associated with collecting accurate data and are photo-realist in style. But the examples comprise highly constructed virtual environments and depict models of the telescope still in evolution.

Roger Malina, a trained astronomer, artist and critic reflecting on dark matter, has commented on the importance of instruments that allow us to access the world beyond our immediate senses, saying that "It is hard to describe the thrill of building a new device and then being the first to be able to see a previously unknown part of the universe."Malina's comments are relevant for considering the relationship between science and technology, which he terms 'techno-science'. He emphasises the importance of instruments, noting: "Certain kinds of knowledge just cannot be obtained until an engineer has invented the right device." [6] Malina adds that for astronomy such instruments are the key to overcoming the limitation of the low range of senses offered by the human body.

The promotional visualisations of the SKA give primacy to the instruments to be used to collect the data. These virtual representations of the physical objects of the SKA are statements suggesting a 'grounding' of the project, which also presents us with iconic statements about the project's technological advancement.

These representations offer an opportunity to reflect on the changing relationship between astronomy considered as a pure science, answering fundamental questions, and the technologies needed to achieve its goals. The historian Paul Forman has reviewed changing attitudes to science and technology and the emergence of an identifiable postmodern reversal of the conception of technology as 'applied science' and as such inferior to science. In a postmodern view technology subsumes science. This is not technological determinism but recognition of 'ordering activities' that constitute culture. [7]

A greater appreciation of the instrumentality of the SKA and the current appreciation of these physical instruments within the development of astronomical knowledge places radio astronomy in the domain of postmodern science, where, in Forman's terms, technology is a set of means to an end or ends and there is less consideration of method. The visualisations account for the current stage of the project, but this may be an indication of the broader ways in which astronomy will be conceptualised as the project is developed. In Forman's terms: "In postmodernity, with technology acquiring primacy, the word 'technology' gradually becomes capable of including science in its denotative compass". [8] As the SKA progresses, artists will have the opportunity to explore the significance of these instruments and how they relate to the changing view of astronomy within postmodernity.

Opportunities

A notable feature of these two related but distinctly different ways of creative and innovative engagement with the development of the ASKAP, as part of the development of the SKA project, is the strong sense of appreciation of a location to communicate ideas that are about exploring distant space. Both projects take us to the Outback in Western Australia and draw attention to the physical remoteness of the possible site for the SKA. This forms a focus for association with cultural attributes that might then become strongly associated with the project.

Choice of location is a predominant feature of the current development of the SKA. The projects described here highlight that preoccupation through the communication of information about interpretation of 'place' associated with one of the possible SKA sites. 'Real world' locations are therefore relevant to the broader narrative and can act as anchor points for future creative work.

There is immense potential for art-science collaborations to explore further aspects of the development of the associated science and technology. What the SKA offers is the potential for artists to consider the implications of the vast volume of data that will be produced that is even a challenge for those developing the SKA. [9] We also need to explore the shifting definitions of pure and applied science. This offers further opportunities beyond those already being demonstrated by the work of the many artists interested in 'applied' areas such as the bio-sciences and nanotechnology.

This interest in the 'applied' is consistent with the observations made above, of a shift to a 'postmodern' science. How will this affect our conceptions of astronomy when associated with the development of the SKA? Additionally, there will be many spin-off technologies. It will be interesting to see how art, associated with radio astronomy, can help us understand this shifting balance between science and technology.

References and Notes:

1. SKA Organization Offical Web Site, "SKA," http://www.skatelescope.org/ (accessed June 14, 2011).
2. Curtin Institute of Radio Astronomy Offical Web Site, "Ilgarijiri: Things Belonging to the Sky (Exhibition Catalogue) 2009," http://astronomy.curtin.edu.au/ilgarijiri/catalogue.html (accessed January 12, 2011).
3. S. J. Tingay, "Ilgarijiri - Things Belonging to the Sky: Connecting Australian Indigenous Artists and Astrophysicists," in The International Journal of the Arts in Society 6, no. 1 (2011): 203-212.
4. YouTube, "Square Kilometre Array (SKA) Official Animation," 2009, http://www.youtube.com/watch?v=8BBoDw2qVD0&feature=related (accessed January 12, 2011).
5. P. Bourke, "Bourke: Fulldome Activity Report," Paul Bourke Personal Web Page, http://paulbourke.net/papers/aps2011/aps2011.pdf (accessed June 23, 2011).
6. R. F. Malina, "Limits of Cognition: Artists in the Dark Universe," 2010, http://malina.diatrope.com/2010/03/16/limits-of-cognition-artists-in-the-dark-universe/ (accessed July 10, 2011).
7. P. Forman, "The Primacy of Science in Modernity, of Technology in Postmodernity, and of Ideology in the History of Technology," in History and Technology 23, no: 1-2 (2007): 2.
8. Ibid., 4.
9. R. P. Norris, "Next Generation Astronomy," Proceedings of the International Astronomical Union's General Assembly (IAU 27), Rio de Janeiro, (2009).

PLACE IN MIND: TOWARDS A DYNAMIC MEMORY PALACE

Adrianne Wortzel & Damon Loren Baker

This paper will discuss interdisciplinary work on memory between psychologists, biologists, roboticists, neurologists, linguists and discuss archetypical models gleaned from those disciplines. This will include historical memory palaces, neural networks, linguistic structures, and biological systems.

Mnemonic devices: Mental Maps and Memory Lanes
Using the Internet to focus on pinpointing particular nuggets of knowledge, while submerged in an illusion of an infinite amount of data accessible through random access, puts forward the idea of infinite combinations of data and access paths. This combinatory power, along with how a user's choices are informed and filtered, erodes the edges of pre-existing consensus models, laws and identities. Borders between disciplines and paradigms are experienced on the web as increasingly tenuous, arbitrary and dynamic. What kind of model, if any, can serve to supply some constraints of structure on a networked art work.

The Ad Herennium (circa 86-82 B.C.), a textbook on rhetoric, contained a memory section divided into "rules for places, rules for images, memory for things, memory for words." Instructions were to first fix places based on the construction of mental architectural models. The larger and more complex the better because more memories could be housed. Knowledge was broken down into discrete particles and topography constructed as a memory strategy. Bits of information were assigned to objects; objects were placed in specific rooms, in a specific path, which would lead the recaller to data in the correct order. It was imperative that knowledge was fixed - adhered to an object -- so that it could be accessed at any time by virtually beating a path to its door.

Both storage and memory both particularly played a large part in the concerns of medieval scholars, theologians, scientists and artists. In medieval Western Europe the artificial memory structure paradigm shifted from architectural models to theological constructs. The territories of heaven and hell became host to specific memories. Memories were assigned to objects, creatures and topographical landmarks in those territories. Theologically based memory palaces had a large influence on creative forces of their times. It is possible to view Dante's Inferno as a journey through what would have been a pervasive and popular memory palace paradigm. In The Art of Memory, Francis A. Yates describes the Inferno as "based on orders of places Hell, Purgatory and Paradise…. The Divine Comedy would thus become a summa of similitudes and examples, with memory as the converting power, the bridge between the abstraction and the image."

In the 16th century, the memory palace emerged from its virtual state into a physical one existing outside of the mind in the form of an installation. The Memory Theatre of Giulio Camillo Interpolated the Greek memory palace by constructing a wooden structure that became the inspiration for the architecture of Shakespeare's Globe theater. Camillo's theater was a representation of the universe expanding its inception through the stages of creation. Every person who entered this magical portal would come away capable of speaking on any subject with the skill of Cicero. The wooden structure, large enough for two people, was commissioned by the King of France and displayed in Venice and Paris.

A reconstruction of The Memory Theater by Frances Yates

"The work is of wood, marked with many images, and full of little boxes; there are various orders and grades in it. . . . He calls this theatre of his by many names, saying now that it is a built or constructed mind and soul, and now that it is a windowed one. He pretends that all things that the human mind can conceive and which we cannot see with the corporeal eye, after being collected together by diligent meditation may be expressed by certain corporeal signs in such a way that the beholder may at once perceive with his eyes everything that is otherwise hidden in the depths of the human mind."

A-Maze

A 20th century labyrinthine line drawing by Umberto Eco (http://www.intelligentagent.com/archive/RoadEco.gif) traces the development of a pun created by James Joyce for Finnegan's Wake. The drawing illustrates a decoding of the pun, tracing possible nodes of association which link the words "Neanderthal," "Meander," and "Tale" from which Joyce formed the transformative word "Meandertale." The newly constructed word "Meandertale" appears to signify the very name of the process that forms it, a meandering quest for associations between words--a quest where these associations simultaneously tell the story of the words' evolution and transform them. In such a well-ventilated world, perhaps one necessary constraint might be to assume that no word suffers more than six degrees of separation from any other.

Clues Without Context

How far astray can the routers of imagination take us from what we can consider true? Can we be sure that such a quest on a well-trodden path is revealing good metaphorical expression? Clues without context i.e., the nodes without synapses--make the subject of the diagram cease to resonate its potential; it simply becomes a representation of itself where everything is equal or in a simplistic hierarchy (some are upper case, some are lower). The labyrinthine journey defined by the convoluted node line occurring between words is sprinkled with alchemical events: occurrences in language where two words together form another that leads to a whole new expression of association and meaning. Such events stimulate vernacular, slang and new languages.

Mystery Without [E]motion

Then again, selecting the nodes in Eco's drawing without their names or connections offers mystery (go ahead, connect the dots)--but the literary metaphor suffers a loss of its muscular tone, its life-like exuberance. As the depiction of convoluted connections disappear in the above drawing, the resonance also falls away, dwindling to nothing. If we absent everything but the line, its function as a pointer to possibilities suffers. We have uniformly subtracted from this path any of its significant elements.

Order without significance

Networked art presents a process than a product. But the process alone without the narrative, or the significant reason to travel through it, seems barren. Where the relationship of one bit of content to another in these works, even at a minimum conjures up additional language in the visitor's mind that makes the leap from one work to another. This invisible text, an emerging hieroglyphic structure in the

reader's mind, is the activity that conjures up a new language of the links and a new mode of presentation. Hypermedia links are pockets, absences, lapses, and synapses, indicating what is inexpressible or interactively assumed by the viewer or reader. The subtext of the work can be embedded, even inconsistently, in the linkages and left to the viewer to decipher.

"Planning is just a way of avoiding figuring out what to do next"

The problems of spatially aware embodied cognition are pervasive. Many disciplines have had to develop strategies to deal with basic questions of 'Where am I?', 'Where is here?' and 'How do I navigate through this place?' in many forms. Some particularly promising techniques have been explored at the intersections between the fields of cognitive science and robotics that may be useful for developing the kinds of advanced spatial navigation of data spaces proposed in this paper. Robots have become advanced enough and cheap enough to be employed in a wide variety of general purposes in relatively uncontrolled environments (for example: using an iRobot Roomba(tm) robot vacuum cleaner to clean the living room floor while you are at work without having to fear for the safety of any household pets that may be roaming about) instead of being restricted to use in controlled industrial environments such as automated factories.

These systems adaptively and efficiently explore their environment using limited contact sensors to determine when they collide with walls or other objects as they follow a semi randomized path through the space. They lack advanced computer vision techniques and have no pre-existing model of what the space is like. They simply know which way they are heading and when they collide with something that would prohibit them moving forward, they go another direction and change the method the pattern they were using to traverse the room (alternating from moving from side to side, spiraling about the room and doing random walks). This may sound simple, because it is.

The robot vacuum doesn't build a high level complex model of the space, it simply reacts to what is immediately happening to it and tries different things when what it was doing did not work. It does not do that because it does not need to. It is able to sense where the boundaries of the area it wishes to explore are and then engages in a controlled and purposeful wandering of that space. The direct feedback that it gets from its environment substitutes for a complex conceptual model. It is a reactive system, with relatively little internal variable state to model the environment. This approach grew out of biological models of how ants and other insects navigate over large areas by following extremely simple rules that rely on responding directly to the environment more than they do on building any complex model of the environment . This subsumption architecture of integrated simple behaviors that respond to a rich environment has been used in a variety of areas of robotics and for tasks such as simulating apparently complex human like behavior in the Sims series of video games. They present a possible method for exploring and designing the sorts of rich data spaces that are proposed in this paper.

References and Notes:

The Art of Memory, Yates, Frances A., Pimlico Press, London, first published 1992, 2000 ed. Cited.,pp.20-21. Ibid.,pp.104-105.

Ibid, Chapter 6. Erasmus, "Epistolae, ed. P.S. Allen and others, IX, p. 479, letter from Vigilus to Erasmus, as quoted by Frances Yates in the Art of Memory, pp. 136-137.

Diagram by Umberto Eco from The Limits of Interpretation, A Midland Book, Indiana University Press, Bloomington and Indianapolis, 1994, Illustration 9.2, p. 141.

R. A. Brooks (1987). "Planning is just a way of avoiding figuring out what to do next", Technical report, MIT Artificial Intelligence Laboratory.

*Rodney Brooks (January 1991), "Intelligence without representation", Artificial Intelligence **47** (1-3): 139–159, doi:10.1016/0004-3702(91)90053-M*

Steels, Luc & Brooks, Rodney, ed. (1995), The Artificial Life Route to Artificial Intelligence: Building Embodied, Situated Agents, Hillsdale, New Jersey: Lawrence Erlbaum Associates, ISBN 0-8058-1519-8

Forbus, Ken (2001) "Under the hood of the sims" http://www.cs.northwestern.edu/~forbus/c95-gd/lectures/The_Sims_Under_the_Hood_files/v3_document.htm

PLAYING IN PLACE NOWHERE: CREATING AN OPEN SOURCE COUNTRY

Andrew Y. Ames & Alexia Mellor (WRMC Collaborative)

Through a combination of performance art and game design, WRMC Collaborative investigates the concept of a digital and conceptually open source country through an analysis of our project, Lokönenie. Lokönenie, meaning "place nowhere," is a portable and mutable nation whose only fixed location is an IP address. With playful interventions, the work is activated in the physical and lives in the digital, connecting disparate locations in web space.

Corporations are the dominant institution of our time and influence everything from the smallest aspect of our daily experience to the most powerful of governments. Today, corporations benefit from greater mobility and rights than do most people. McDonald's, Starbucks and IKEA, for instance, are international brands that shape individual interests. What, then, does nationality mean in a corporatized world?

Corporations and governments actively define physical and virtual borders. Surfing between websites is the contemporary equivalent of moving between states or countries. IDs are checked, information is collected, fees are paid, all to gain or restrict access. Despite virtual space's ability to cross borders and connect people, access is determined by forces in physical space. China's government has banned Facebook; Google Inc. has restricted access to YouTube content based on local copyright laws and the location of an IP address; corporations maintain firewalls that protect their Intranet and limit employee access to the Internet. For better or worse virtual space, physical space, corporations and governments are intertwined, shaping the collective meaning, experience and cultural identity of place.

Using contemporary technologies and drawing upon art movements such as the Situationists and Fluxus, WRMC Collaborative has created Lokönenie, a nation based on open source principles challenging a fixed definition of place. Personal identity is derived less from place of origin, but rather is constructed within a globalized economic, political and cultural climate. Cultures are morphing into a monoculture characterized by urban migration, corporate expansion and technological innovations. Through play strategies, Lokönenie integrates aspects of corporation and government to create the possibility of a culture of one's choosing. With installation, performance and digital art WRMC builds a nation whose citizens are active online and off.

What is Lokönenie?

Lokönenie exists in three formats: public, private and virtual spaces. The milieu from which it springs is one where media are controlled by corporations and social media sites are replacing town hall demonstrations. Although we may not know our neighbors, we do have 447 Facebook friends. WRMC embraces this format of community building by placing the virtual at the center of where citizens can instigate change. Lokönenie citizens, or shareholders, are not asked to relinquish their current national allegiances. The motivation in creating Lokönenie is to dispel the notion that identity is bound by place, and to create a nation-state that takes the dominant governing principles of corporate culture and subverts

them to create a parallel culture; a physical and virtual subculture. Citizens are shareholders in this cor-porate state, responsible to and for the conditions of the nation. Citizens moderate all aspects of the na-tion: from how and what is governed, to establishing a framework for political freedoms and civic duties. Lokönenie provides citizens with a space to govern and act as they see fit, provided they follow WRMC's one rule: changes must be for the benefit all citizens. What is deemed "best" is up for interpretation by the group and reflects the community's shifting concerns and ideals in response to current conditions.

Lokönenie seeks to discover whether a country following an open source platform will instigate individ-ual action on behalf of a group. Fascinated by the fact that Facebook has almost twice as many users as the United States has citizens, we question, "does a voice in virtual space hold the same power as a voice in physical space?" Facebook users do not have the right to vote or make changes to the site's for-mat, but they do fervently voice their disgust when the proprietors make updates or alter the rules of use. Many organizations and politicians turn to Facebook to attract voters due to the website's ability to engage tech savvy masses in signing petitions and sharing links with "friends." The corpor-nation of Facebook and other social media sites have expanded their borders and influence beyond simply sharing status updates. Recent uprisings across the globe have turned to Google, Facebook and Twitter to orga-nize protests and broadcast social unrest. "Corporate" is derived from Latin corporatus, and means "united in one body." [1] Lokönenie reclaims the Latin meaning by uniting groups of people through a co-opting of corporate structures and forming an organizational principle by which this new national body can operate in public, private and virtual spaces.

PUBLIC

Public performances take an interventionist role with WRMC, dressed as representative consultants of Lokönenie, entering into public spaces and claiming an area with our tarp and flag. As consultants we act like canvassers, planting our flag in parking lots and public parks, asking passersby to fill out forms for entering the country. The interventions serve to disrupt the normal use of the space and encourage public engagement, whereas the forms serve as a means of collecting data about participants and their responses to questions similarly found on official US government forms. The forms ask participants for information including Social Security Number, address and weight, favorite song, and a minimum wage they would be willing to work for as a non-resident immigrant to Lokönenie. The questions promote the consideration of the underlying agendas of these documents that we are so accustomed to completing. Having filled out the form, visitors are then welcome to enter the demarcated space.

PRIVATE

Private installations take place within the white walls of the gallery. The gallery acts as the temporarily fixed capital or franchise where participants encounter a set of rules that they must follow to enter the work and become the performers. These rules involve taking off shoes for security measures, filling out visa applications, and finally entering the space of the ten foot by ten foot tarp that marks the area Lokönenie inhabits. Lokönenie performs as a sovereign state which citizens may use as they wish, from a space to read War and Peace, to a place to find peace during war. By placing Lokönenie in a gallery set-ting, we challenge art's role and its potential to actively effect social critique. Further, we challenge the spatial neutrality of the white cube as the gallery sets the stage for the discourse surrounding art as po-litical agent.

VIRTUAL

The URL for the website (http://lokonenie.projectsoya.net) is Lokönenie's virtual and only fixed location; its headquarters or embassy where decisions are made and information is stored. The virtual space of Lokönenie is set up to follow an open source model. Open source is generally a production practice, however in this case it is a philosophy that provides access to end product source materials with the possibility of modifying them to benefit the whole. Utilizing MediaWiki, an open source wiki platform, we create a forum for a democratic, self-policing community of citizens with a common interest in upholding a nation-state based upon equal access. Participating citizens/shareholders can download visa applications and census forms for use in public interventions, patterns for making the flag and tarp, and modify documentation on the wiki. All alterations must follow specific guidelines that adhere to the spirit of Lokönenie and its mission to create an open state.

The name Lokönenie, derived from Esperanto means "place nowhere," and highlights the transitory, dislocated nature of our country and our desire to promote a place without geographic, cultural or language barriers. Based on corporate and government organizational principles of duty to shareholders, popular sovereignty, ability to legislate, and flexibility of operations, Lokönenie fosters a multi-national and multi-platform culture. The work is activated in the real world and lives in the digital where disparate locations become connected in virtual space. The public interventions, website and gallery installations facilitate dialog about perceptions of borders, access and territory, as well as how we identify with place as a fluid idea.

The desire to create a neutral space has been attempted before in the physical world. A historic example is the Esperanto-speaking territory of Neutral Moresnet, later known as Amikejo ('place of great friendship'), which was established as a 3.5 sq km sector in between the Netherlands, Belgium and Prussia in the early nineteenth century. [2] Residents introduced their own form of branding with postage stamps, a flag, currency and a national anthem all to instill a sense of national pride and cohesion. Although Amikejo was not successfully incorporated as an independent state, its ideals of a stateless space have persisted.

Play

The creation of Amikejo exemplifies the Situationist principle of psychogeography, whereby one actively shapes and is shaped by physical spaces, resulting in a relationship to place that is constantly evolving and fluid. As the urban landscape continues to grow and nature is increasingly replaced by technology, psychogeography takes on a particular relevance to the ways we understand spatial strategies. In the vein of the Situationists, Lokönenie uses play and experimentation to alter assumptions about place. Whereas the Situationists focused on altering ways of navigating urban space we take this as a starting point and expand our inquiries to include virtual space. We apply and reboot these approaches to blend with contemporary technologies. Pairing the Situationists' mode of creating "situations" with Fluxus' mode of setting up unconventional playful happenings, we produce actions that bend the rules of corporate engagement and political policy, resulting in conditions that are both familiar and unexpected.

Play serves as a point of entry for participants to interact with the work physically and conceptually. We establish rule sets that imitate and simultaneously subvert existing corporate and government systems, using humor to make transparent the governing systems at hand. These rules define how players move through levels of engagement to gain access to Lokönenie. Informed by Huizinga's theory of the Magic

Circle, [3] our rule systems provide a framework to reflect on the familiar contexts of public, private and virtual space. In the case of Lokönenie, the portable country acts like an embassy or a multi-national corporation, claiming and taking over an area within one of the three realms. The understood rules and codes of conduct in these spaces are temporarily replaced by the rules of Lokönenie, altering the ways participants interact with the physical and social environments. The core of our methodology is based on the principle that understanding comes through action not simply observation. It is this direct participation in the project that we refer to as performativity.

As Judith Butler describes it, performativity takes as its foundation that all social reality is an illusion created from our implicit acceptance of and enactment of codes of conduct and power structures. [4] We perform the various roles society dictates: the role of man or woman, the role of employee, the role of citizen, much like an actor performs the role laid out in a script. Butler describes performativity in regards to gender, but the principle is equally applicable to all facets of social interaction. Once it is understood that everything is in fact performed in relation to pre-determined structures, one can choose to alter either the structure or the behavior in response to said structure. Lokönenie co-opts and manipulates existing and recognizable characteristics of corporations and government to perform something new: a hybrid of corporation and government.

The codes of corporate identity are performed through branding. Just like corporations and governments, WRMC has generated a set of symbols to represent and make recognizable the state of Lokönenie and its open source culture. The branding is carried through all forms of artifacts used in performances, installations and on the web: official documents, the flag and tarp, and our uniforms. These symbols indicate when participants enter into Lokönenie and transcend pre-existing social borders. Ultimately, the branding of Lokönenie is synonymous with an open, accessible and sovereign space.

History

The critique of government has been a thread throughout art history. While the addition of corporate critique to the canon is more recent, it reflects the corporation's position as the dominant institution in our culture. Several predecessors have explored these ideas and it is important to note their differing and influential approaches as we further add to the dialog.

Constant Nieuwenhuys, an artist-architect originally involved in the Situationist International movement of the 1960s, envisioned his own idea of a post-capitalist utopia where play was the underlying structure for society: New Babylon. Through alterations in architecture and the creation of "situations," New Babylon aimed to transform daily life by suggesting that urban space and architecture are both, in fact, amorphous and temporary, responding to and impacting human interactions. [5] In 2011 the artist group Benrik introduced their Situationist iPhone application. The app, termed by the artists as the "first proto-Marxist iPhone app," asks members to act out "situations" in the real world that were selected via the virtual, all with the intention of creating an uncommon everyday. [6] Nieuwenhuys and Benrik take as their medium the various social interactions that occur within public space and use play to modify the context or create "relationships" between people that might not otherwise interact. Similarly to both Nieuwenhuys and Benrik, we enlist play as our primary tool to distort social norms and create situations in which strangers come together to create an exchange.

The artist projects NSK State and Refugee Republic also seek their own forms of utopia to challenge socio-political circumstances. The Slovenian artist group IRWIN created NSK State, "the first global state of

the universe" [7] as an ongoing project through which its founders and citizens produce art, exhibitions and a congress to meet with citizens and further link the political with art. NSK State was initiated amidst the cultural and political turmoil of the former Yugoslavia in the 1990s, and along with its musical wing, Laibach, investigates ideas of denationalization through a blend of political activism and art. Refugee Republic (RR) is another example of a multi-faceted project that links art and politics. Like Lokönenie, RR lives online and engages people in political dialog through corporate practices. The project calls attention to the migratory patterns of refugees and their economic potential in the twenty-first century by registering itself as a corporation in the state of Nevada (USA) and selling stock shares. [8] The aim is to demonstrate the investment potential and economic value of refugees. RR expands the dialog around migration with their downloadable passports, to show that we are all in some way displaced. NSK State, RR and Lokönenie each call upon art as a means to initiate discourse around socio-political critique.

Games offer another method for extending political and institutional critique. NationStates.net allows players to create their own nation based on their political ideals. Originally created by Max Barry as a marketing ploy for his novel, Jennifer Government, the game gained unexpected popularity and has become a powerful tool to experience politics in action. Players debate, moderate and resolve issues as a group through the "World Assembly," akin to the United Nations. There is no way to win the game, but nations are ranked by the "World Assembly" on items such as economic strength and civil liberties. [9] Both NationStates.net and Lokönenie create the terms and conditions as a framework but it is how one plays the game that creates the opportunity to directly experience and consequently critique political policy.

Building upon the dialog of artist as activist, we are developing strategies to expand Lokönenie's impact in private, public and web space. As we continue to develop and increase the technological presence of Lokönenie, there are three directions we are currently pursuing: mobile applications, microblogging, and commodity manufacturing. Our first foray into mobile applications will include the use of QR codes read by mobile devices. The QR Codes left at intervention sites function as ports of entry to find our country online. The codes are miniature territories accessible by passports in the form of key technology. Leaving the QR codes extends the intervention as we attempt to redefine physical, virtual and cultural landscape.

Our second expansion includes a microblog where Lokönenie's citizens are encouraged to document and post images of their own interventions into public space. To facilitate this civic service, we are implementing a Tumblr which shows where Lokönenie has been and becomes a means to connect participants in a united virtual nation. The virtual nation is mapped out based upon users' IP addresses which mark their virtual and physical locations.

Lastly, for citizens who would like to perform interventions but do not wish to make their own flag and tarp, we will have available on our website manufactured packaged country kits, complete with instructions and artifacts for purchase. The packaged country further intertwines the ideas of nation and corporation by turning the symbols and artifacts into commodities.

It is our intention that as the citizen/shareholder base increases, they will take greater ownership over the project and play a crucial role in its trajectory. In creating an open source country, we empower individuals to take an active role in organizing a possible alternative. In doing so, a parallel culture emerges through this empowerment that borrows from the corporatized monoculture dominating today and highlights the socio-political issues at play.

Although with Lokönenie we turn to virtual space as a possible solution to create an alternative global culture, we are keenly aware of its limitations. Accessibility proves to be one of the most prevalent issues regarding technology as a utopian solution with much of the world still without Internet connection. If decisions are exclusively being made by those with access to technology, how do we provide a platform to hear the voices without access? With Lokönenie, we explore how physical and virtual cultures co-exist with the potential of inspiring members to actively contribute to the enrichment of the cultural landscape in both. A culture is created through a shared set of values and goals that are upheld and reflected within the behavior of the group. Cultures accumulate symbols that represent these shared beliefs and serve to reinforce and guide the learned behaviors. Creating a culture in both a corporate setting and a government context is crucial to organizational strategy. Culture, in both cases, is fluid and evolving and dependent upon the individual members to actively participate in its formation. In the digital age, culture is not limited to place.

Extending the ideas of open source we question what a corporate country might look like. Typically, open source is counter to corporate culture where profit is the ultimate driving force. As CEOs and Prime Ministers of Lokönenie, we rewrite corporate and government rules through performativity and play, and create a new objective for corporate culture that makes the greater good of the people, rather than profit at any cost, its primary motivation. Citizens of Lokönenie engage with our rule sets and enter a space in which they are empowered to instate policy change and ultimately cultivate their own culture online and off. Lokönenie as "place nowhere" reflects the globalized culture in which we live and offers an alternative to place-bound identity.

References and Notes:

1. *Merriam-Webster Web Site, "corporate" http://www.merriam-webster.com/dictionary/ corporate (accessed May 20, 2011).*
2. *Jens S. Larsen, "[en] Amikejo: The Esperanto Country that Almost Was," Ipernity, April 12, 2010, http://www.ipernity.com/blog/jens_s_larsen/242660, (accessed May 20, 2011).*
3. *Johan Huizinga, "Nature and Significance of Play as a Cultural Phenomenon" in Homo Ludens: A Study of the Play Element in Culture, (Boston: Beacon Press, 1950), 11-27.*
4. *Judith Butler, Gender Trouble: Feminism and the Subversion of Identity (New York: Routledge, 1990) 34, 185-93.*
5. *Mark Wigley, "The Great Urbanism Game," in New Babylonians, eds. Iain Borden and Sandy Mc-Creery, 8-11 (London: Academy Press, 2001).*
6. *Benrik Official Web Site, "Situationist App," March, 2011, http://benrik.co.uk/content/ situationist.asp (accessed March 3, 2011).*
7. *NSK States Official Web Site, "First NSK Citizens Congress | Berlin 2010," August, 2010, http:// congress.nskstate.com/ (accessed May 20, 2011).*
8. *Kathy Rae Huffman and Margarete Jahrmann, "Refugee Republic," Heisi Online, http://www. heise.de/tp/artikel/4/4023/1.html (accessed May 13, 2011).*
9. *NationStates Official Web Site, "Frequently Asked Questions," Aug, 2002, http://www. nationstates.net/page=faq (accessed May 17, 2011).*

BENJI: A BRIEF HISTORY OF THE MAN WHO BROUGHT THE INTELLIGENCE OF SEARCH TO OUR DNA

Amy Suo Wu

Benji is a fictitious entity that journeys into the world of bio-information as commodity and envisions the prospects of genetic discrimination and the increasing personalization of marketing. Named after the child of Sergey Brin (Google.com) and Anne Wojcicki, (23andme.com), Benji represents an ideological and economic union seen in royal political marriages and corporate mergers. Benji's mission is to be the world's leading DNA search engine.

Although Prof. Benji Brin is best known for founding Benji™, the world's leading DNA search engine, he cannot be categorised so simply. If nothing else, his life was too varied, his influence too broad. There are tribesmen in Southern Africa, for example, who know nothing of bioinformatics and Benji™, but know Prof. Benji Brin for his philanthropic efforts. Likewise, there are factory workers in Albania who know him only as a pioneer scientist; children in China who know him as the wise author of their code of destiny; and readers, in dozens of languages, who know him only for his many literary achievements. So Prof. Benji Brin is not an easy man to define, and certainly does not fit popular misconceptions of him as some 'guru scientist,' an aloof and contemplative figure. Yet the more one gets to know this man and his achievements, the more one comes to realise that he was precisely the kind of person who could bring to us the unprecedented DNA search engine, an invention that will continue to shape our world for centuries to come.

Born prematurely on the 25th of December 2008 in Los Altos Hills, California, Benji Michael Brin chose to arrive one week earlier. The auspicious birth of this remarkable child, on this holiest of days, anticipated a lifetime of faithful reverence, fortune and wisdom. Nestled in his mother's bosom, the newborn infant was serenely calm, yet a certain cheekiness – which would always remain part of his personality – unmistakably glimmered in his eyes. Baby Benji couldn't wait to embrace the world that he was destined to change. Naturally, one could say that he was born brazenly defiant of nature's ways, an attitude that brought with it the gift to shape his own fate. And so it seems that from the very beginning, Benji was a self-made person, bound to become the celebrated visionary figure now remembered by billions.

His father, Sergey Brin was the renowned co-founder of the internet giant Google.com, while his biotechnology-savvy mother, Anne Wojcicki, was the co-founder of 23andme.com. In the warm sunshine of their hillside estate grounds, young Benji grew up enchanted by the panoramic view of the valley, as well as the intricate patterns he saw in wondrous life forms no bigger than the tip of his rosy little pinky. At the same time, in the safe confines of his parents' estate, in the comfort of the family library and technology facilities, young Benji already showed a rare talent for computer science. His reading habits were also well beyond his years – philosophy, science and the pillars of Western literature – all part of an effort to satisfy a rare and boundless curiosity. Even before he could fully understand the underlying science, young Benji was keenly aware that his father had inherited from his grandmother a mutation of a gene called LRRK2, which seems to predispose carriers to hereditary Parkinson's disease. As a result, he also spent his formative years pondering the consequences of birth, the fragility of life

and the bitter fatality of disease. Eugenia, his grandmother, a Jewish-Russian immigrant and a former computer engineer at NASA, played an important role in young Benji's life. Grandma Gena, as he called her, lovingly nurtured him while his parents were busy with their work, but she also strictly disciplined him when he stepped out of line. She vested in him all the secret knowledge she had acquired during the course of her illustrious career. Stricken with grief, he couldn't bear to think that one day his father and dear grandma Gena would be robbed of their vitality by the mercilessness forces of nature. Young Benji vowed to hunt down and fight what his father euphemistically called 'his personal bug', to demystify once and for all the process of biological breakdown known to humankind as mortality.

In high school, young Benji regularly confounded his examiners, having previously discussed philosophy with his private tutors, engaged in spirited scientific debate with his parents, and auto-didactically cultivated the art of meditation. However, there was one specific event, which was to mark the beginning of the first major branch of his career. Obviously, his parents' work brought them into the very nucleus of the American high-tech elite. Their business enterprises attracted the best and brightest businessmen, politicians and research scientists, from local Silicon Valley to the farthest corners of the earth. Celebrities and luminaries such as Natasha Vita-More, Andrew Hessel, Mark Zuckerberg, Eugene Kleiner, and the Rockefeller family regularly dropped by for coffee visits or friendly chats. However, one particular person was to radically transform young Benji's view on the mechanisms of life. When he was introduced to Ray Kurzweil, during a dinner party, which his family hosted annually, Benji was absolutely enthralled by Kurzweil's theories of Singularity and his admirable quest for transcendence. At last, Benji thought, here was a real chance to provide not only future security for his beloved community, but also to possibility overwrite his family's genetic weakness. Although the encounter left him with many unanswered questions, this was the moment when Benji's enduring interest in unravelling the mysteries of the human DNA code was born.

With his parents' blessings, Benji was admitted, at the tender age of fifteen, to the prestigious Singularity University. This in itself was a startling achievement, as he was the youngest applicant ever to join the Exponential Technologies Executive Program, ordinarily reserved for the ranks of venture capitalists, CEOs, strategists, entrepreneurs and government leaders. Already rising above his exceptionally gifted heritage, Benji now showed an extraordinary aptitude for networks and computing systems, biotechnology and bioinformatics. He was a fervent student, excelled in all his classes, and was already close to making his first groundbreaking discovery. As radical as it may have seemed at the time, he had a hunch that the source of all 'original behaviour' takes place at the most fundamental level – the genetic level. He hypothesised that if psychological mood cycles and physical habits could be conquered within the gene, then it should be possible to not only predict and determine, but also to essentially pre-empt, any actual physical manifestations – thus preventing otherwise inevitable diseases, drug addictions and other factors of biological breakdown. It was here that he first began to work out a rudimentary version of his theory of 'DNA Switch Isolation', which he was to further develop in his seminal doctoral thesis. This was the discovery that soon brought Prof. Benji Brin to found Benji™, and ultimately led him to a series of previously unimaginable technological achievements.

Among other landmark events, Prof. Benji Brin became the first to scientifically isolate and draw accurate prognostications from DNA, while objectively demonstrating technological potentials of human transcendence well in advance of contemporary scientific thought. His vision of Benji™ was to create the ultimate service: controlling our destiny through DNA. Its goal was to empower individuals while developing new ways of accelerating scientific research and the market-driven economy. Benji™ combined genetics with the ubiquity of the Internet to produce a significant and positive global impact. Using state-of-the-art technology, Benji™ carefully analyses our personal genetic information and matches our

data to personalised advertisements, which are guaranteed to enhance our day-to-day life, as well as our long-term health and life expectancy. The company proudly claims that its database contains the most complete health and DNA records of the human race. As the value of genetic information increases, Benji's™ mission has broadened to further improve corporate research of the ways in which genetic data predetermines our lives. This way Benji™ can continue to provide an increasingly refined and superior service. To assure that the technology is available to all humankind, Prof. Benji Brin has personally directed the international spread of Benji™, paving the way for the rapidly approaching global enlightenment. Benji™ is a practical service, applicable to every aspect of human existence. It is a service for the here and now. Yet at its core and within each and every Benji™ lies this enduring invitation from its Founder: "We are extending to you the precious gift of freedom and immortality – factually, honestly."

BASIC INTERACTION DESIGN EDUCATION: CREATIVE SOLUTIONS IN VISUALIZING ACTIONS

Asım Evren Yantac & Oguzhan Ozcan

Now, everyday life gestures are all around us with the advances in ubiquitous technologies. While this will help more intuitively used interfaces, it will also bring more standardization. And one step ahead, wide use of standard gestures will be limiting creativity for case specific creative solutions. This paper shares our experiences on creativity triggering practices on visualizing actions.
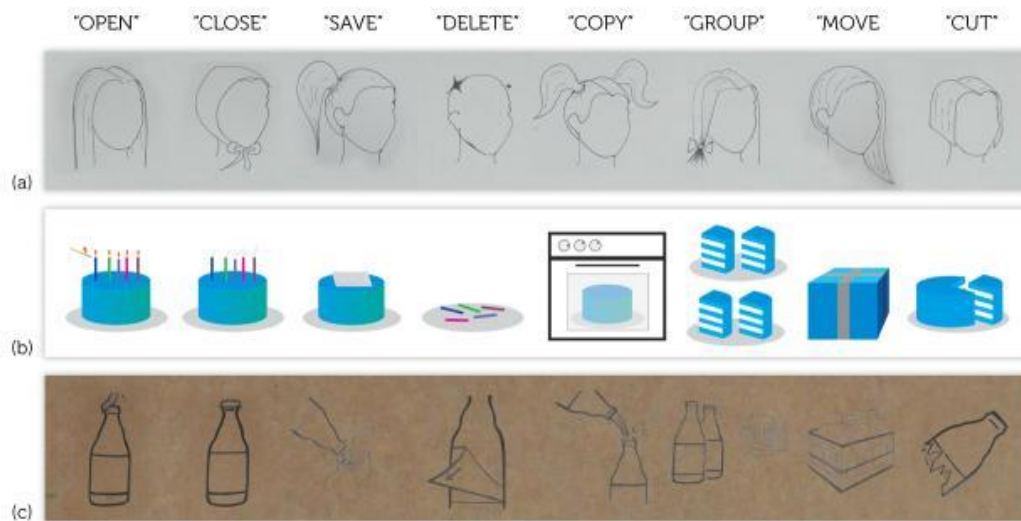
Fig 1. Examples from the "One noun and eight actions visualization" practice. (a)Hande Demir, 2011, (b)Ulas Tayyar, 2011, (c) Hande Demir, 2011.

Fig 2. Examples from the "One noun and eight actions visualization" practice. (a)Nice Uysal, 2009, (b)Nice Uysal, 2009, (c) Gokalp Gonen, 2009
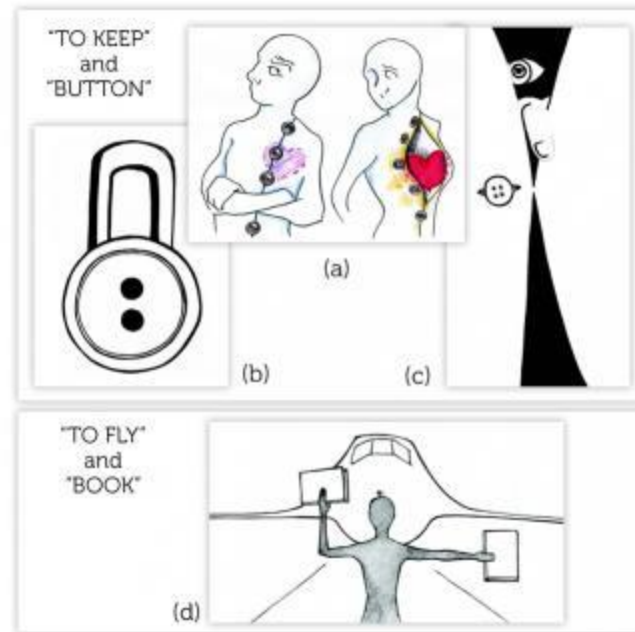
Fig 3. Examples from the "one noun and one action visualization" practice. (a)Nice Uysal, 2009, (b) Doga Corlu, 2009, (c) Sevgi Beyhan, 2009, (d) Ömer Yasar, 2002.

The Need for Authenticity in New Interaction Design

The "desktop metaphor" has been occupying our lives since 80's. Thus we learned to live with mice, icons, menus, button like graphic objects, desktop, alternative navigation paths like mental model abstractions, which all needed to be learned. While we all had to learn this metaphoric digital world, today's children are opening their eyes into a digital world and they easily learn to use these apparatus. We can even say that they do all the things by intuition.

But now, things are changing with the advances in ubiquitous, wearable, tangible technologies. A field called Natural User Interface (NUI) [1] has arisen. We interact with the computers using gestures through devices we wear, cameras, and detectors. Apart from other advantages of the NUI, [2] this means that we can control them with our daily life knowledge and habits. While gestures makes things easier with affordance, predictability, learnability, WYSIWYG, [3] this situation might cause problems in some cases like it might not be that easy to conduct the gesture in several situations.

With all this data in mind, when we look from the designer side, things are not that easy. An up-to-date interaction designer has to know this new gesture library and the standards of it so that he can design functional solutions. Hence, it will be a challenge to find authentic, in a more design oriented term, "creative" solutions regarding case specific needs. For the clarification of creativity in interactive media, we can use the "bringing something into being that is original (new, unusual, novel, and unexpected) and also valuable (useful, good, adaptive, and appropriate)" definition by Osche. [4]

Here, in this paper, we share our experiences of constructing the basic IMD education with action oriented information design. There are several methods [5] we use, one of which concentrates on visualizing actions as described in this paper. The main idea relies on ontological metaphors [6] as mediating artifacts which is a widely used education method for ideation and visualization process. But here, we focus on interaction based issues like action-reaction relations, predictability, WYSIWYG.

Our Basic Interaction Design Education Process

Since 1999, for triggering IMD students' creativity, we have been working on "Breaking the Rules" education methods like;

- Re-reading traditional cultures
- Obstructions (auditory/haptic/visually limited interface design) for Breaking the Rules in Interaction Design [7]
- Participatory Design and Emerging Technology Case Studies [5]
- Random objects' unfamiliar interactions

First three practices are based on complex design problems for the third and fourth year students. In the light of these experiences, we decided to start this visionary practice from the beginning of four years education as the problem seem to be more like a fundamental structure of interaction thinking.

First thing we did is to start this fundamental process from the second years with the "random objects and unfamiliar actions" practice. We urge the students to "re-define" or "re-form" artifacts or objects, with unfamiliar actions applied onto them. The main idea of the practice relies on the idea of ontological metaphors to be used as a mediating artifact. This process shouldn't be named as basic personification but the object is re-designed as a more intelligent whole. The students have to develop a whole interactively working mechanism from a natural object.

While above explained process helped us with focusing on the complex structure of interactive mechanisms without being bound to technological constraints, there was still something missing regarding creative yet working solutions about action-reaction visualization of action messages. It was hard for the students to explain;

- what the message meant,
- how you should use it,
- what is going to happen when you do it,

in a one frame image.

This time, turning back to our first year students, we restructured our basic interaction design education and looked into the practices of message visualization. We've been giving cases studies of combining one random "noun" and one random "verb" in one still image (Figure 1).The results didn't express the action enough and as a hard case study students couldn't focus on developing alternative solutions to action-reaction relations. Thus we developed the course structure with below explained study of visualizing action oriented image visualization.

Implementation of the Action Oriented Image Visualization for Basic Interaction Design Education

During the years 2008-2011, we studied with 45 first year interaction design students within the basic interaction design course which runs simultaneously with the basic design course and each week we give different ideation practices to the students.

With the above stated knowledge of previous experiences, we added another case study of considering one random noun with eight predefined nouns; to open, to close, to save, to delete, to copy, to group, to move, to cut (Figure 2, 3).

Students develop ideas and sketch as much as alternatives of visualization of these ideas. And the works are evaluated by a jury regarding these criteria:

- To give the right information on what happens if you use the image, how to use,
- Creativity,
- Consistency,
- Alternative amount.

Rather than evaluating the general performance of all the students we examine every single idea and discuss whether it contains any authentic outcome from the action-reaction relation point of view. We conduct the same study for 3 weeks.

Discussion

As a starting point for the evaluation of this experience, we should clarify some facts;

- Instead of considering this practice as an icon design case study, it should be considered as an information visualization sketch for basic interaction. (Fact 1)
- Main idea is to develop the fundamental vision of action-reaction relations for interaction design. (Fact 2)
- This vision will help the students with any kind of further study in information design of interaction. Especially, for the emerging technology case studies in which the students are not familiar with and there is high standardization of interaction (Fact 3)
- By not limiting the students with neither interface, nor technological constraints, we want them to stay out of "cliché" ideas (Fact 4).
- Using one random "noun" with these 8 actions helps them to start thinking of consistency while they are sketching for case specific solutions (Fact 5).

Students participated in this practice so far, have shown us that this is a considerably easy task for them and they can produce many alternatives when they are not bound to technological and interface constraints. They feel free to imagine basic but creative relations between the object and the 8 actions normally assigned to interface interactions.

We accept that these out of standard ideas might not work when applied to interface design, but this is not our focus. What we are trying to formulate is the well thought conceptual ideation of action-reaction relations in interaction design and the ability to visualize these thoughts. Students with this experience, coming to the further steps of our interaction design education structure, are easily adapting to

the case studies of natural objects' unfamiliar interactions and also the interaction for the emerging technologies case studies in the next step. Our studies on gesture based interactions for natural user interface, augmented reality and tangible interaction case studies with these students have been much more effective than our previous experiences.

What we aimed at adding such a practice to our basic interaction design education was to strengthen the first step of "breaking the rules" structure and form the basis of creative ideation process in interaction design. With this point of view, they are moving to the next stages in which we try to prepare them to a harsh design environment of emerging technologies, standards and "cliché" designs. What we should do now is to follow the effects of this study throughout the next years of their education and see what kind of objects and actions are more effective.

References and Notes:

1. *Matthias Rauterberg, Morten Fjeld, Helmut Krueger, Martin Bichsel, Uwe Leonhardt, and Markus Meier, "BUILD-IT: A Planning Tool for Construction and Design," Proceedings of the Conference on Human Factors in Computing Systems (CHI 98), Los Angeles, (April, 1998): 177-178.*
2. *George Fitzmaurice, Hiroshi Ishii, and William Buxton, "Bricks: laying the foundations for graspable user interfaces" Proceedings of the Conference on Human Factors in Computing Systems (CHI 95), Denver, Colorado, (May, 1995): 442-449.*
3. *Apple Inc., "Apple Human Interface Design Principles," Apple Developer Web Site, http://developer.apple.com/documentation/userexperience/Conceptual/AppleHIGuidelines/index.html (accessed January 15, 2008).*
4. *Richard Osche, Before the Gates of Excellence: The Determinants of Creative Genius (Cambridge: Cambridge University Press, 1990).*
5. *Evren Yantaç, Oğuzhan Özcan, and Ayşe Emengen, "Participatory Study in Interactive Media Education: Disabling Environment and Augmented Reality Case," in Digital Creativity 22, no. 1 (2011): 40-48.*
6. *George Lakoff, and Mark Johnson, Metaphors We Live By (Chicago: University of Chicago, 1980).*
7. *Oguzhan Özcan, Evren Yantaç, and Mary J. Lou, "Breaking the Rules in Interactive Media Design Education," in Digital Creativity 20, no. 1-2 (2009): 115-124.*

AUGMENTED MOVEMENT VISION: MOVING, SEEING AND SENSING

Tyng Shiuh Yap

The embodied Augmented Reality screen has the potential to alter and augment the dimensionality of our perceptual field through the form and content of the overlaid image. Such augmentation would affect the way our body habitually moves and navigates. This paper explores A.R. expanded spatiality and our body's plasticity or flexibility to refigure and adapt to movement in space with augmented movement vision.
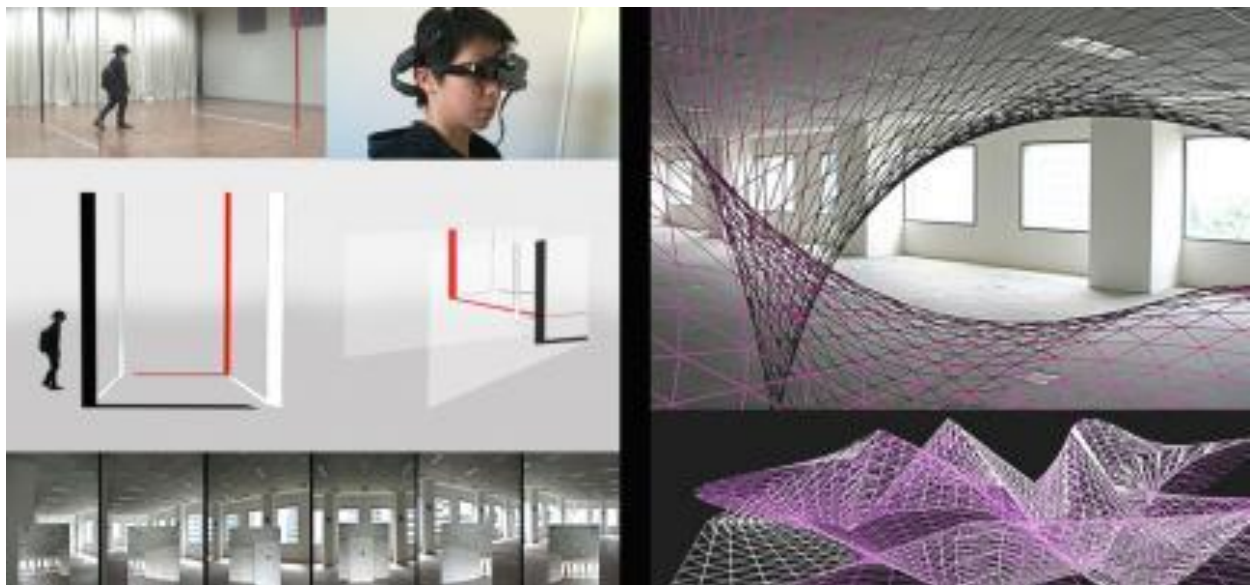
Mpov (Left) – IsoThread (Right), 2010 - ongoing, Tyng Shiuh Yap, Augmented Reality, © Tyng Shiuh Yap.
Credits: IsoThread is co-produced in-part with the Banff New Media Institute (BNMI, Canada).

INTRODUCTION

BODY WARES: SCREEN MATERIALITY

The embodiment of the virtual screen presents a situation in which information has to be organized in relation to the moving body. Conventionally, the mobile virtual space is employed as infospace that is structured around egocentric and/or allocentric spatial frameworks in relation to the body, and without the need to be in a continuous field of Cartesian space. [1] The virtual space, in this way, function as a presence or an absence feature that is aligned along with the structures of the physical but is not constrained by location and physical continuity. It is contended here, further, that structures or features in the virtual space need not at all be aligned within the logic of the Cartesian co-ordinate system - that is, the virtual image can serve as a direct extension that transforms or augments the dimensionality of the

actual space. The potentiality of the virtual screen lies, in part, to the fact that it is a null-space without the necessary constriction of physical laws. Its (screen) materiality consists of a medium through which contents and meanings are being projected from. The malleable virtual contents can function as simulation, representation, presence or mirror, and so forth. Therefore, the embodied virtual space could extend not only spatiality but also, more radically, the user's body frame. This implies that there are more potential within such trans-spatiality between the actual and the virtual than the conventional spatial habits and expectations of our body allow. Such spaces do not just present new forms of spatiality but challenges both the body plasticity or flexibility to re-adapt as well as our conventional body-space-time notions of directionality, positioning and orientation in spatial traversing.

TO MOVE, OR NOT

Philosopher Elizabeth Grosz commented that rather than refiguring embodiment, virtual space is often employed in a manner that reaffirm Cartesian mind/body division. [2] There is good reason why (embodied) screen space, in spite of the potentiality of its materiality, is not deployed in more radical ways of interaction to push the capabilities of the body. The kind of augmentation proposed above, challenges deeply ingrained habitual ways of being, and therefore are physically discomforting to the body when implemented. Fracture made to the linearity of the physical space can be made coherent and manageable when the image space is seemingly external to the body, which means that the multiplication of image spaces do not break the singularity of the body's perceptual frame. However, when augmentation starts to encroach onto the embodied space of the moving body and is deployed as a direct re-structuring of spatial dimensionality or as a re-embodiment of the body, they become highly unmanageable to the body. Which is to say there is a disparity of functional requirements between movement vision or vision for movement and locomotion versus vision for more inactive or stationary activities like reading or simply visually scanning the environment.

Enactive theories expound that perceptual representation is derived from actions. However, here, there is the reversed scenario in which perception precedes the possibility for action. Intuitively, one can perceive and analyse the augmented scene more readily, from an external standpoint, than one can learn to re-coordinate one's body to move fluently across the augmented embodied space. Just as, when lost, we stop and refer to our streetmap, to bring actions down to the minimal level, and using our cognitive skills to re-orient ourselves in space. This does not denounce the possibility that higher level off-line perception is inherently rooted in former sensorimotor experience and its memories. [3] It is to be argued in this paper that the challenges of an augmentation of movement vision could be (better) overcome along with the development of both cognitive as well as movement strategies for the body to re-learn, refigure and rehabituate, when the body's usual perceptual relationship with space is augmented either from within or without.

LAYERING: REALITIES

Whilst the embodied screen has the capacity to simulate all kinds of scenarios and configurations, it possesses certain characteristics that are unique to its medium, in its actual relationship to the body and to the extended space. These could be directly translated into the kind of spatio-temporality that it can configure for embodied experience that is not shared by other set-ups. With its integration with the perceptual field of the body, its content, in fact, has no fixed locality within extended space and has no inherent situatedness – other than with its host, the body.

EXPANDED SPATIALITY - TEST SUBJECTS

To explore such hybrid dimensionality, this author is currently developing a series of augmented reality art projects with the working premise of using AR strategies to present ways of perceiving and navigating through space that expands from the circumscription of our physical make-up.

In the "Mpov: xTread" (Fig. 1, Left) series, the user moves around a site with the ability to control concurrently an additional moving point in AR space – which function as an autonomous doubling of her presence and movement in space, such that she is navigating from two positions at once. This project begins with the idea of an expansion of perception from the persistent single, frontedness of the human bipedal body, and investigates the navigation of space with an additional viewpoint. The body (through the multiplied viewpoint) creates a space of active geometry as it moves. In this work the body centredness and directionality is disrupted in that moving forward is not necessarily going forward, but backwards, leftwards etc.

The "IsoThread" (Fig. 1, Right) series work with virtual forms that transcend from the regularity of directionality and orientation that our body experience when it traverses across the stable structures of the flat ground. The user navigates the actual space through the virtual topological reality as augmentation. The IsoThread project presents a situation in which the body is invited to reconcile the translation of its position and orientation between the physical environment and the form of the virtual model. In traversing through the virtual and actual space concurrently, the mapping of the virtual form onto the physical space is devoid of any fixed location and orientation in actuality. By mapping the topological with the flat plane, going forward loops back on a twisted axes. There is no going forward, backward, left or right.

XRELATIONAL : AUGMENTED DIMENSIONALITY : ACTIVE GEOMETRY

The projects above are designed to explore the character of dynamicism that can be brought about with the embodied screen through the layering of realities between the virtual content and the actual space. Volumes of spaces could be nested and juxtaposed, dynamically re-sized and morphed, becoming simulation or doubling the actual as re-presentation, all of these configuring space in a non-Euclidean manner. The situatedness of the body within the extended space becomes extended relational (xRelational) in such trans-spatiality. This is because the state of the moving body described here is not so much being relational to other bodies/structures in space, rather it has to be ready to extend from its embodied situatedness and adopt (or embody) a multiplication of positions, viewpoints and spatial reference frames – in the process rendering space as folded, heterogeneous, multiplied and informatics. Incongruous spaces and views inter-join and split apart, configure and reconfigure. The flipping in and out of viewpoints and perspective forming an inter-crossing of perspective (xPerspectival) creating 'any-spaces-whatever'.

Such configuration produces active geometries, where the experiential space does not have the regularity of flow but consists of interpenetrating volumes which form sub-regularity of orientation, directionality and positioning as the body's perceptual reference frame is decentered. Such virtualization of embodied space, virtualizes the body by making contingent the body's borders, and making dissolute the supposed boundary of its exocentric and the egocentric spatial reference and altering the spatio-temporality logic of its movement in space. Subverting Euclidean linearity, the qualitative and differential takes on space structuring and geometricizing functions; with the body creating and configuring space as it moves.

IN-EXCESS: AUGMENTED MOVEMENT VISION AND TRANS-SPATIAL BODY SPACE

The Augmentation of Movement Vision identified here occurs in two manners. Firstly, in the embodied augmented reality, visually led movement creates a disparity between the perceptual information that is received through the virtual screen and the information that is received through the other modalities of the body. Secondly, the augmented reality vision, in this case, forms a multiplication of spatial references and fracturing of the body's supposed singular egocentric frame. The augmented vision forms an excess that results in the body's needs to re-learn how it can represent and organize new forms of spatial information to facilitate coordination of its collective parts for actions. This is in contrast to what Brian Massumi terms movement-vision, which describes a proprioceptive state, with no division of subject and object. [4] Augmented Movement Vision, here, describes a level of experience which is closer to the state of internal representation, where a lack of singularity or incongruency of movement in space registered in relation to the single-directional vision of the moving body would break down the body's capacity to manage movement.

Unlike phenomenological notion of consciousness as defining experience, Bergson argues that consciousness is derived from the multiplicity of information the body receives; and that our conscious perception is a 'necessary poverty' (or diminution) of our image of matter. [5] For Bergson, conscious representation of the matter suppresses and filters away the information it receives of that which is of no interest for our bodily functions. However, the body is inherently plastic and flexible. Functions of the body are not set in stone, they are open to change brought on by the necessity and demand for new forms of actions in heterogeneous environments. This plasticity of function underlies evolutionary theories of phylogeny and ontogeny (namely, the development found in a species and in an individual over time). Neuroscientist Daphne Bavelier's research on the effects of multi-tasking in Gaming found that gamers who had to content with split-screens action scenarios for extended time starts to adapt and evolve new mental and vision speed and skills that enable the smooth and skillful means of managing the split-screen environment. [6] Bergson's notion of a center of indetermination suggests such openness of the body. Information received is at first unextended in the body, through training they become localized, thus what we experience is memory.

It is inferred here that perhaps the above suggests that the visual information in seeming excess of the body's usual functions can be re-embodied with the whole body through the implementation of interaction between the image and the body movement. That is, to re-figure the body movement to accommodate this excess. The idea for this hypothesis is drawn from the examples of experiments undertaken in the field of neuroscience. It has been shown in experiments that the Body Schema – our representation of our own body – show qualities of plasticity. Neuroscientist Angelo Maravita and his colleagues found that multi-sensory integration of visual, tactile and proprioceptive information in primate brain enables it to construct various body-part-centered representations of space; and that this representation shows

plasticity for change as active tool-use extends the reachable space and modifies the representation of peri-personal space or the space within the arm-length of the body. [7] Separately, it is known that we can dislocate or project our bodily actions onto the video screen and maintain the integrity of our coordination just by following our actions on the screen – as it is commonly performed by surgeons. This follows that our body schema have the same potential to couple with the screen space as part of its own peri-personal space, and that 'virtual tools' could be employed in a similar manner to extend our body space with the virtual space.

COUPLING WITH THE VIRTUAL – A PROPOSAL

In the A.R. project "Mpov" introduced above, the perceptual field in one of the eyes is partly overlaid with the space of the virtual – such that the eyes is looking at the two spaces at once. This may sounds like that the overlaid image would occlude much of the perceptual field. However, in practice, our stereoscopic vision naturally merge the virtual image onto the actual with some degree of transparency.

In order for the body to efficiently move in such trans-spatiality, the body has to be coupled with the virtual space in some manner, such that the body can find new means of co-ordinated movement. When the virtual space stays outside of the movement space of the body, it puts on cognitive load on the brain. Embodying the virtual has the advantages of off-loading mental processes that would be otherwise be needed to make sense of the hybrid space. Through refiguring the body's movement, the new movement patterning derived will off-load this into physical processes. Some neuroscientists would agree that mental and physical processes are not distinct but have integrative roles to play in our thoughts processes.

Further, from the neuroscience concepts of bodily path structure and subspaces, it is inferred that a possible method of implementation is to engage the use of a certain part of the body (one of the arms, for instance) to operate and interact with the virtual space. In this manner, the body space is segmented into two frames of realities, and the user can learn to reconcile the hybrid space through movement and sensing.

Path structure is the geometry rules in which our bodies described spatial structure, they determine the distance and direction trajectories for movement. [8] Each movable part of the body has its own path structure, and there are collectively a hierarchy of different path structures in which some belong in the sub-spaces of others. The rotation of the eyes is a path structure that is considered a subspace of the movement of the head. Subspaces working collectively together produces greater degrees of freedom of movement. The plurality and division of sensorimotor spaces suggest the potential for which the body is open to refiguration for more complex scenarios and to the modification of its internal representation of the extended space it maps. When one arm is tap to control and interact the virtual reality, the body is able to physically sense the virtual, as an extension, within the degrees of freedom of movement the arm allows.

"LEARNING A NEW ACT" – ACTION, CONCEPT AND THE BODY

Cognitive scientist Andy Clark points out that there is a robust finding that mental rehearsal can actually improve sports skills and the part of the brain called the cerebellum commonly known as the motor area. [9] He notes the discrepancies in the amount of time proprioceptive feedback information reaches

to facilitate the action of smooth skilled reaching, which is between 200-500 milliseconds, in contrast to the mere 70 milliseconds the body could actually perform the same action, suggests that neural circuitry that had learnt the pathways involved in the act could trigger the same pathways on cue. [10] This shows that internal representation does play a role in our actions.

If this raises the case that, indeed, language and concepts aid our body movement, then the next question is: are concepts developed from bodily experiences, from our internal representations, or are they independent products. The Deleuzian ontogenetic notion of concepts argues that concepts do not arrive from experiences without creative and productive conditions. Concepts do not merely state the conditions in which identities are formed, rather they produce real knowledge that are creative analysis rather than facts that are representations of the world.

The challenge then is in creating new concept and language that can more adequately assist us to habituate and navigate the increasing complexities of the digital ecology.

References and Notes:

1. *Frank Biocca, Arthur Tang, Charles Owen, Weimin Mou and Xiao Fan, "Mobile Infospaces: Personal and Egocentric Space as Psychological Frames for Information Organization in Augmented Reality Environments," in Foundations of Augmented Cognition, ed. Dylan D. Schmorrow, 154-163 (New Jersey: Lawrence Erlbaum Associates, 2005).*
2. *Elizabeth Grosz, Architecture from the Outside: Essays on Virtual and Real Space (Cambridge, MA: The MIT Press, 2001), 85.*
3. *Jacques Paillard, "Knowing Where and How to Get There," in Brain and Space,ed. Jacques Paillard, 461-481 (Oxford: Oxford University Press, 1991).*
4. *Henri Bergson, Matter and Memory, trans. N. M. Paul and W. S. Palmer (New York: Zone Books, 1994), 188.*
5. *Ibid., 171.*
6. *Michelle Trudeau, "Video Games Boost Brain Power, Multitasking Skills," NPR.org, December 20, 2010, http://www.npr.org/2010/12/20/132077565/video-games-boost-brain-power-multitasking-skills (accessed May 28, 2012).*
7. *Angelo Maravita, Charles Spence and Jon Driver, "Multisensory Integration and the Body Schema: Close to Hand and Within Reach," in Current Biology 13, no. 13 (2003): 531-539.*
8. *Jacques Paillard, "Motor and Representational Framing of Space," in Brain and Space, ed. Jacques Paillard, 163-182 (Oxford: Oxford University Press, 1991).*
9. *Andy Clark, "Embodiment and the Philosophy of the Mind," in Current Issues inPhilosophy of the Mind: Royal Institute of Philosophy Supplement, Volume 43,ed. A. O'Hear, 35-52 (Cambridge: Cambridge University Press, 1998).*
10. *Ibid., 22.*

JUST TYPE – A MULTICHANNEL PLATFORM FOR EXPERIMENTAL TYPEFACES

Jesvin Puayhwa Yeo

This paper reports the journey of making interactive art projects that showcases inspirational and experimental typefaces. It uses radio-frequency identification technology, videos and projectors to create a typographic world that reveals the history, inspiration and experimental design of typefaces. The result is a multichannel platform consisting of three interactive art projects.

Fig. 1. Left: Screenshots of the journey of a font. Center: Type Personality. Right:Pangram Art

Fig 2. The console for Type Personality (left), Interactive table (center) and alphabet tags (right).
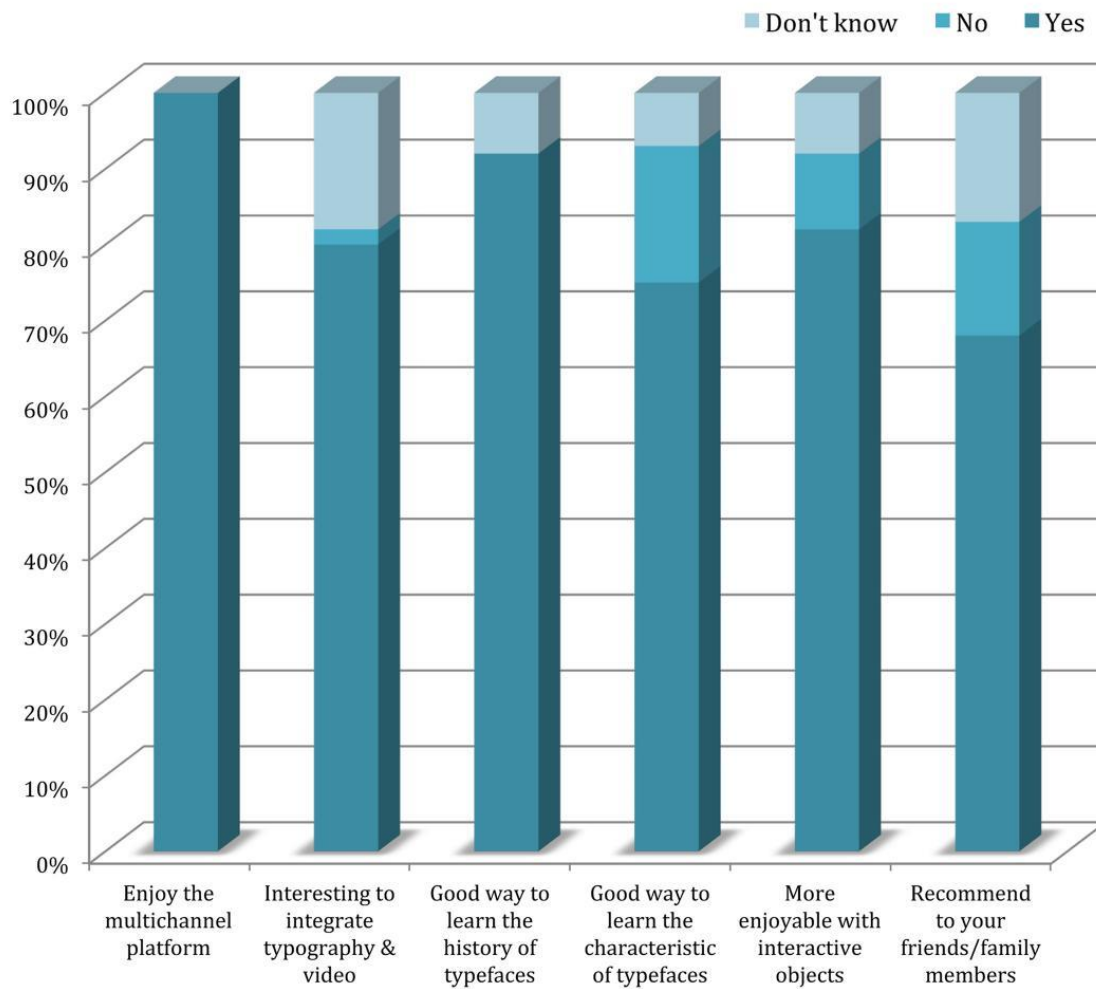
Fig. 3. Survey results

Typography needs to be audible.

Typography needs to be felt.

Typography needs to be experienced.

_Helmut Schmid, designer and typographer

Communication is the main purpose of letters but "there's more to a letter than simply its sound or shape". [1] The different shape and character of a letter affects how we read. For example, a tagline printed in an advertisement evokes a different response in the reader than the same words that appeared on the screen. Given the existence of over 100,000 typefaces, many of which are freely accessible to designers, what are the processes through which one chooses a font? Are our choice of typeface based purely on our aesthetic preferences or influenced by the associations we have of a particular typeface's history and cultural significance? This article aims to explore our experiences with typefaces.

This article reports the journey of making interactive art projects that showcases inspirational and experimental typefaces. It exemplifies how the author selects typefaces and imagines typefaces as people with their own characters and histories. The projects use radio-frequency identification (RFID) technology, interactive videos and projectors to create a typographic world that reveals the history, inspiration and experimental design of typefaces.

The result is a multichannel platform consisting of three interactive art projects – The Journey of a Font, Type Personality and Pangram Arts. The teaching and learning of typography is usually textual, with little or no visual supplements. [2] [3] Therefore, the experience of this multichannel platform is designed to be interactive, fully visual and enjoyable. All videos have an ID and viewers have to use the RFID alphabet tags or the RFID cube to activate it. The multichannel platform is exhibited in a gallery to collect data. The survey results show that the multichannel platform can serve as a useful resource for novice graphic designers, as well as spark the curiosity of anyone with an interest in typography. In addition, the use of typography in video allows us to reclaim the lost art of arranging typefaces in a way that would make an 18th century typesetter's head spin. [4]

The Making of the Art Projects

Art project One, The Journey of a Font, comprised ten typographic motion graphics videos. Inspired by the movement in typography by typographers, Ralph Coburn and John Maeda, [5] [6] the videos explored the concepts of spatial dimension, human/ environmental scale and motion. Each video showed the inspiration of one typeface, introduced its designer and tracked how the font had been used. To begin with the project, desk research was conducted to understand the history and inspiration of twenty-six typefaces. The typefaces selection was based on the alphabet A to Z and the name of the typeface. For example, Avant Garde had been chosen for letter A, Bembo was chosen for letter B and so forth. In the end, ten typefaces were selected for further development. The criteria were based on their interesting background and by the standard of 30 essential typefaces for a lifetime by Joshua Berger. These ten typefaces came into existence between 1845 and 1989, namely, Avant Garde, Bembo, Clarendon, Din, Frutiger, Gill Sans, Helvetica, Trajan, Univers and Vag Rounded. The idea of these typographic motion videos was focused on aesthetic outcome. On the start screen, thousands of letters were flying ubiquitously. When the RFID was activated, the information of a typeface emerged from the flying letters and displayed artistically. The videos were created from Adobe After Effects and original typefaces were used for text display.

Art project Two, Type Personality, comprised ten motion graphics videos. This project was an interactive exploration of typographic form. The idea derived from the personal experience of the author. Being a font fanatic, the author remembers typefaces by visualizing them as people based on the history or popularity of the typeface. She believesone need to be familiar with each typeface to be able to understand their personalities and use them appropriately. In this project, the author anthropomorphized typefaces

and gave them unique human attributions, so that viewers may understand the typeface characteristics through interaction and play.

The formation of the characters of the typefaces used the style of Bembo's Zoo [7] by Roberto De Cumptich de Vicq – a children's ABC book that fashioned letters of the alphabets into animal likeness. Except that it was more complex and refine. The final character designs were formed by hundreds of letters using Macromedia Freehand.Next, Adobe Flash was employed to create the animation of the characters. Each motion graphic video showed how the used of letterform, colour, contrast, scale and layering gave typefaces their distinct personalities. The challenging part of this art project was to upload the vector images to Adobe Flash. The whole image had became raster image in Adobe Flash, therefore individual letters had to be uploaded separately.

Art Three, Pangram Arts, comprised six motion graphics videos that explored the connection between pangram and visual. A pangram was a phrase that used all twenty-six letters of the Roman alphabet at least once. A pangram was invaluable to graphic designers because it aided visualisation of what each letter would look like in a font. The pangrams in this part of the art project gave expression to the colloquial, yet unique, Singlish spoken in Singapore by merging language, illustration and typography. The Singlish pangrams served as the basis for creating the visual images. For example, one of the pangrams was 'Four yellow top black taxies drive up Jalan Bukit Merah on quiet hazy night to liakgao'. In Singlish, Jalan Bukit Merah' is a housing estate in Singapore that frequent by lovers and 'liakgao' mean peeping Tom in Malay language. Therefore, a visual of four taxies and a man with dripping mouth was drawn to represent the pangram. The pangrams were also layout in typographic style to use as part of the video.

When the six images had been sketched, the process of making this art project was almost the same as art project two. Macromedia Freehand was employed to create the vector image of each pangram. Then, Adobe Flash was used to create the animation. This art project was the easier to create as mistakes had been learned from the first two art projects. Three pieces of music were also especially composed for all the videos to prevent copyright issues. Being a first-timer doing projection arts, the author had also learned that it actually take a longer time for a person to read the information of the projection on the wall than on the computer screen.

The Integration of Videos and Radio-frequency Identification Technology

The final phase of the project was to integrate the videos and the Radio-frequency Identification (RFID) technology. The project used two kinds of activation methods. One method was to activate the videos from a distant of 30 cm to create a surprise effect. This method used alphabet tags that were designed especially for this project. Each alphabet tag was made up of two sheets of black acrylic and a passive RFID tag. The RFID tag was to be embedded permanently between the acrylic sheets, therefore, passive RFID tags were chosen because it relied entirely on the reader as their power source and read up to one foot away. Every RFID tag came with a unique ID. [8] [9] Twenty-six alphabet tags of A to Z were created and each tag can activated one movie on both art projects One and Two – The Journey of a Font and Type Personality. The other method was more interactive as the viewer had to throw a cube on a special designed table to activate the videos. Six RFID tags were placed firmly on all six surfaces of the cube and covered with vinyl stickers. This method activates all six movies in art project Three –Pangram Art. All passive RFID tags used in this project were read-write storage tags, in which data can be added to or overwritten.

Being a graphic designer and not a hardcore programmer, the author used the simplest method to program the interaction – Adobe Flash's Action Script. To begin the programming, all twenty-six motion graphics videos of the three art projects had to be converted to swf format. Next, in art project One, The Journey of a Font, all ten motion graphics videos in swf format were uploaded to one flash file. Each motion graphics video was created as an RFID object with the same unique ID as the assigned RFID tag. After the programming, the flash file was exported as exe format. When the assigned RFID tag was read on a RFID reader that was linked to the computer holding the exe file, the video would play automatically. Subsequently, the same programming process was applied to art projects Two and Three.

The Multichannel Platform

The final outcome was a multichannel platform that held the three art projects. Two interactive consoles and an interactive table were custom made to hold the projectors, computers, speakers and RFID readers. The multichannel platform was installed in a gallery as an exhibition for the public to experience it and give feedback. The exhibition was named Just Type. The experience of the multichannel platform was designed to be interactive, enjoyable and informative. Before entering the multichannel platform, viewers had to choose an alphabet tag. If viewers want to view all the videos, they had to use all the twenty-six alphabet tags. The interactivity of the component of the three installations was controlled by the action of the viewers standing in front of the consoles or table. The viewers can either wave the alphabet tag in front of the consoles or by throwing the RFID cube on the interactive table. By doing one of the actions, it activated and played the motion graphics video that had the same unique ID from the tag or the cube.

A questionnaire survey was conducted to capture feedback from viewers. Two trained interviewers were in the gallery for three weeks to carry out the survey. One hundred and twenty questionnaire forms were collected. The interviewees were in the age rangeof fifteen to sixty-four. Sixty-five of them were novice and student designers. The survey results were promising, as it showed that 100% of the interviewees enjoyed the installations and 80% of them think that it was an interesting idea to integrate typography and video. 92% of the respondents stated that it was a good way to learn the history of typefaces and 75% of them agreed that it was a good way to learn the characteristic of typefaces. Sixty-one of the novice and student designers had also commented that it was useful for them to know the inspiration of typefaces. From art project One, they had learned which typeface was used and/or appropriate for certain medium. They also felt that art project Two, Type Personality, was a good way to remember typefaces but they visualized it differently based on their own interpretation. 68% of the interviewees would recommend the exhibition to their friends and family members. For non-designers, they commented that they were surprised that there were so many typefaces in the world. They were even more amazed that graphic designers actually study the anatomy of a typeface and the layout of text. 82% of the respondents agreed that the experience of the exhibition was more enjoyable because of the RFID cube and alphabet tags.

Conclusion

Exploring the interface of art and technology, Just Type is a multichannel exhibition that makes use of radio frequency identification (RFID) technology to explore the world of inspirational and experimental typefaces. The twenty-six videos introduce viewers the histories and personalities of typefaces and pangram art according to the algorithm of the videos' RFID tags, thereby allowing a unique interactive experience. This project has created an enormous palette of possibilities for creating interesting experiences

for exploring typography design. The multichannel platform has combined the experience dimensions of interactivity, intensity, breadth and meaning.

The final outcome has successfully created a platform to experience the physical interaction design with RFID and at the same time learn the history and characteristic of typefaces. The survey results seem to agree, maybe because it is refreshing as this is the first typography cum technology exhibition in Singapore. In addition, there are two popular art and design schools in the area of the gallery. Lecturers have brought their typography class to the gallery. Therefore, the multichannel platform has become a useful resource for novice and student graphic designers to learn how to choose a typeface for design project, how to remember a typeface and how to have fun with typefaces.

The integration of RFID technology and video projection is not new in the world of technology. But it is fresh in the area of typography design and as an exhibition piece. Although RFID technology has been used in our daily life, such as, library books, staff or student's card, etc, it is still able to create wow effects because viewers are unfamiliar with how the RFID technology works. Out of curiosity and too shy to ask, there are viewers who actually open the front of the console in secret to see what trigger the videos. In the area of education, the multichannel platform can be used in other disciplines like Science, Chinese, History, etc. The same RFID technology can also be applied to commercial outlets, such as, the sale of art pieces in tradeshow or gallery. For example, in a tradeshow, gallery owners can track the liking of their customers by recording the unique ID of their customers when they stand in front of an art piece for more than 5-10 minutes.

References and Notes:

1. *Joshua Berger, 30 Essential Typefaces for A Lifetime (Minneapolis, MN: Rockport Publishers, 2006), 7.*
2. *Ellen Lupton, Thinking with Type: A Critical Guide for Designers, Writers, Editors, & Students (New York: Princeton Architectural Press, 2004).*
3. *John Kane, A Type Primer (New Jersey: Prentice Hall, 2002).*
4. *Web Designer Depot, "18 Creative Examples of Typography in Motion," July 23, 2009, http://www.webdesignerdepot.com/2009/07/18-creative-examples-of-typography-in-motion/ (accessed on December 10, 2010).*
5. *Helmut Schmid, Typography Today (Tokyo: Seibundo Shinkosha Publishing Co., Ltd, 2002), 120.*
6. *Maeda Studio, "hanabi_calendar 1997," December 21, 2008, http://www.maedastudio.com/index.php?category=type/ (accessed on December 10, 2010).*
7. *Roberto de Vicq de Cumptich, Bembo's Zoo: An Animal ABC Book, (New York: Henry Holt and Co., 2000).*
8. *howstuffworks, "How RFID Works," http://electronics.howstuffworks.com/gadgets/high-tech-gadgets/rfid3.htm/ (accessed January 16, 2011).*
9. *Hal Warfield, How Barcode and RFID Works [Kindle Edition], retrieved from Amazon.com.*

ELECTRONIC MUSIC AND TWO COMPOSERS FROM TURKEY

Seyit Yore

Electronic music is one of the first mainstreams of contemporary art music created in both art music and popular music. But it is not known enough on art music, so the aim of this paper is to describe electronic art music with historical process, basic features, the principal composers and two important composers from Turkey as a descriptive study of historical musicology in the qualitative research method.

Introduction

Actually electronic music is a composition and performance of music with electronic devices. These devices are electronic recorders, sound sources and musical instruments. So acoustic sounds can be modified and converted to electronic sounds, also electronic sounds can be produced directly, and electronic and acoustic sounds can be combined with these devices. These processes are used for both electronic art and popular music composition. However, creation of electronic music was based on art music and its all the processes started to be used in popular music after nearly a century. So all information on process of electronic music was examined historically and given systematically together with the Turkish composers in this paper.

Historical and Technical Process, Compositional Methods and Principal Composers

In fact everything on electronic music and music recording begun with the phonograph invented by Edison in 1877. Recorded natural sounds were modified with the phonograph, so that the first studies of electronic music begun with these experiments. Then electromechanic instruments and electronic signals begun to be invented in the early 1900s. Telharmonium (or Dynamophone) was the first electronic musical instrument invented by Thaddeaus Cahill (1867–1934), an inventor, between 1897 and 1902. It was prototype of the synthesizer which produces different pitched hums according to the speed of the Edison dynamos. Also new electronic signals continued to emerge after the Telharmonium. The Triode Vacuum Tube (Oscillator) which was an amplification of electrical signals invented by Lee DeForest (1873–1961), an American inventor, in 1906. Amplification of electrical signals, radio broadcasting and electronic computation, amongst other things were used firstly for electronic music composition, and these still have been used today. While many studies and new sound sources were being made, electronic music begun to be discussed and written during the same years. Firstly, Italian composer Ferruccio Busoni (1866–1924), wrote about electronic music in his book 'Sketch of a New Esthetic of Music' in 1907, and also it was discussed and classified by some Italian futurists like Luigi Russolo (1883–1947), who wrote 'The Art of Noises' for electronic music in his manifesto in 1913. So that they supported electronic music and in fact all the studies called as the mainstream of noise in contemporary music. Other studies also continued in the meantime that the 'Theremin' was the second electronic musical instrument invented by Léon Theremin (1896–1993), a Russian inventor, in 1919–20. Then the first known work, 'First Airphonic Suite for Theremin and Orchestra,' was composed by Joseph Schillinger (1895–1943), a Ukrainian composer, in 1929. So that electronic art music begun to be composed firstly in the world in the first quarter of the twentieth century. Actually before electric bells was used by composer George Antheil (1900–1959), in his 'Ballet Mécanique' (1925) as the first electric instrument. After the 'Ondes-Martenot' was invented by Maurice Martenot (1898–1980), an inventor and a cellist, in 1928 as

a new electronic musical instrument. It was used firstly by composer Dimitri Levidis (1886–1951), in his 'Symphonic Poem for Solo Ondes Musicales and Orchestra' in May 1928. However, it is known composer Olivier Messiaen's (1908–1992) works such as 'Fete des belles eaux' (1937), 'Trois petites liturgies de la Presence Divine' (1944) and 'Turangalila-symphonie' (1946–48). Also Cemal Reşid Rey (1904-1985), Turkish composer, had composed his 'Poem for Ondes-Martenot and String Instruments' in 1934 although it is not known enough. The studies on new musical instruments continued and the 'Trautonium' by Friedrich Trautwein (1888–1956) in 1929, and then the 'Hammond Organ' was invented by Laurens Hammond (1895–1973) in 1934. The Trautonium was used firstly by Richard Strauss, Paul Hindemith and Edgar Varèse in their works. As for the 'Hammond Organ,' in fact it is an electronic organ, has been used in blues, jazz, gospel, and rock musics, but its usage was not seen in art music. While the first musical instruments and amplificators were being improved in approximately thirty-five years, the 'Magnetic Tape Recorder' was invented by engineer Fritz Pfleumer (1881–1945), as the first electronic music recording and composing device in 1928 in Germany, and it was developed in the USA. John Cage (1912–1992), and some composers, begun to use it in their several works. For example, Cage's works, 'Imaginary Landscape no. 1 (1939) and no. 2 (1942)', were the first in the Magnetic Tape Recorder. After the studios begun to be founded for electronic music in 1940s, and so that RTF (Radiodiffusion-Télévision Française) can be considered as the first studio in 1945. Pierre Schaeffer (1910–1995), composed firstly his 'Etude aux Chemin de Fer' in RTF in 1948. These works were the beginning of studio realizations and 'musique concrète' (real music). 'Symphonie pour un homme seul' was composed by Pierre Henry (1927) and Schaeffer in 1950, and it was accepted the first major work of musique concrète. The studio was formally established as the 'Groupe de Musique Concrète' in 1951, and other composers such as Olivier Messiaen, Pierre Boulez (1925), and Karlheinz Stockhausen (1928–2007), composed in there. NWDR (Der Nordwestdeutsche Rundfunk) Studio was founded in Cologne in 1945, and Stockhausen was the most important composer in there. His 'Gesang der Junglinge' was the first major work in NWDR. So electronic music composition method, realized with many electronic equipment, emerged in several studios between 1930 and 1960s years. Also 'The Music for Magnetic Tape Project' was developed as a American Electronic Music in the USA in 1950 after of the Magnetic Tape Recorder. But it did not continue for a long time. [1]

However Columbia-Princeton Electronic Music Center (CMC) was founded by composers and proffesors Vladimir Ussachevsky (1911–1990), Otto Luening (1900–1996), Milton Babbitt (1916–2011), and Roger Sessions (1896–1985), in 1950s as the first center of electronic and computer music in the USA. They were the founders and from the first generation composers of the CMC. Also many famous composers visited, worked, or studied in there, including Edgard Varèse (1883–1965), Bülent Arel (1919–1990), Halim El-Dabh (1921), Luciano Berio (1925–2003), İlhan Mimaroğlu (1926), and Mario Davidovsky (1934). [2]

There were developed the three composition styles based on essentially the same tools and objectives as a result of studio studies. Firstly, Musique Concrète was composed with manipulation of acoustic sound sources in RTF. Secondly, Electronische Musik was composed with electronic sound generators and modifiers in NWDR studio. Magnetic Tape music was a recording of sounds such as spoken voice, singing, musical instrument and sound effects, and re-creation of sound waves. Musique Concrète and Electronische Musik called as the 'Electrophonic Music' in the UK. In fact these are all the same electronic music with their compositon methods and electronic equipments, but called differently according to the countries. Mimaroğlu said that these different names is unnecessary. Because their basic materials were audio tape and studio. So that all of these should be called as the electronic music. [3]

Some new studios continued to be founded in some countries from 1955 in addition to the above: Milan Studio de Fonologia RAI established with as artistic director Italian composer Luciana Berio. Also Japanese composer Toshirō Mayuzumi (1929–1997), founded NHK Electronic Music Studio in Tokyo. Phillips studio was established at Eindhoven, Holland, and then shifted to University of Utrecht Institute of Sonology in 1960. So that many composers composed their electronic works in the studios. [4]

Also electronic sound sources and other technical equipment continued to develop in addition to the studios in the same years. Raymond Scott (1908–1994), a composer and an engineer, designed the first 'sequencer' which converted the elements of music in electronic media from 1950s and after Clavivox synthesizer was invented by Robert Moog (1934–2005), as a portable sound source of several musical instruments in 1956. Then the 'RCA Mark II synthesizer' was developed as the first major voltage-controlled synthesizer in the CMC in 1959, and used by the composers such as Luening, Ussachevsky, Babbitt, Jacob Druckman (1928–1996), Davidovsky, Charles Wuorinen (1938), and Pril Smiley (1943). It has also been used widely in several genres of popular music. There are most well-known 'Switched-on Bach' album made with the synthesizer by Wendy (Walter) Carlos (1939), an American composer and musician. Synthesizers were the beginning of live electronic music performance that 'the Synket,' a live performance instrument was used extensively by composer John Eaton (1935), in his works such as 'Concert Piece for Synket and Orchestra' (1967). In fact the first live performance begun with Theremin, because it had been used with acoustic musical instruments in Schillinger's work. However, synthesizer has produced completely several electronic sounds. So it is used as a stand-alone orchestral. In addition to these, composers Lejaren Hiller (1924–1994) and Leonard Isaacson composed 'Iliac Suite' for string quartet, and it was the first computer-assisted composition (also algorithmic composition) in 1956. So that computer music begun as a method of electronic music. Max Mathews (1926–2011), a composer and an engineer, designed MUSIC at the Bell Labs in the USA as a direct digital synthesis language in 1957. He also continued as a leader in digital audio research, synthesis, and human-computer interaction as it pertains to music performance. He designed many computer programs, and so that computer performance of music begun with an IBM 704 in 1957 in NYC played a 17 second composition on the 'MUSIC I' program. While the studies of computer music were continuing, there were new studies on synthesizers in 1960s. American composer Morton Subotnik (1933), established San Francisco Tape Music Center with Ramon Sender (1934), a Spain composer, in 1961. Donald Buchla (1937), was a new pioneer of the sound synthesizer in there. Charles Dodge (1942) composed 'Speech Songs' (1972) based on early speech synthesis research. Jon Appleton (1939) and his friends invented 'the Dartmouth Digital Synthesizer' later to became 'the New England Digital Corporation's Synclavier' (1976–1993). IRCAM (Institute for Research and Coordination in Acoustics and Music) became by French composer Pierre Boulez a major center for computer music research and realization in 1977 in Paris, and developed 4X computer system, featuring then revolutionary real-time digital signal processing. It was used to transform and route soloists to loudspeaker system firstly for Boulez's 'Repons' (1981) by 24 musicians and 6 soloists. Combined of electro and acoustical art music are IRCAM's importance. [5]

MIDI (Musical Instrument Digital Interface) was designed by Dave Smith's studies as a new tool of electronic computer music from 1981. It is an industry-standard protocol that enables electronic musical instruments (synthesizers, drum machines), computers and other electronic equipment (MIDI controllers, sound cards, samplers) to communicate and synchronize with each other. While it is going on as a popular tool, also interactive computer-assisted performance became popular from 1990s. Tod Machover (1953) composed 'Begin Again Again' for 'hypercello' in an interactive system of sensors measuring physical movements of cellist. It was played firstly by cellist Yo-Yo Ma (1955). [6]

So far, the process of electronic music summarized briefly in a century with the several features. However, it has continued as a mainstream and method of contemporary art music today.

As a result of this information, electronic music can be defined a creation or changing of music by electronic equipment. That is, recorded sounds on the magnetic tape which are passed from oscillator and their combination as a composition. So that there are three compositional methods: The first method is a combination of acoustic and electronic sounds and instruments like Theremin. Second method is usage of electronic musical instruments and other instruments in the studio. In the third method is electronic sounds produced with acoustic instruments. The first and the third methods require musicians to play the compositions. But the second method was composed and recorded only by one composer himself. That is, it does not require any musician, but composer may need a sound engineer for equipment of studio if composer does not know to use enough them. Also composers use altered and tranformed sounds with electronic equipment. Sounds are changed specially by them for their works. So that the first section of this study was completed. The following second section is two composers of electronic art music from Turkey.

Two Composers from Turkey: Bülent Arel and İlhan Mimaroğlu

While electronic art music is being composed in the World, it is composed in Turkey, too. So that there are even two important composer from Turkey, and they composed their works in the USA. Firstly, Bülent Arel was born in 1919 in İstanbul, trained as a classical composer in Ankara State Conservatory from 1939 to 1947. Then he worked as a pianist, sound engineer and teacher in the conservatory and the Ankara Radio from 1950, and founded the Helicon Society in Ankara and held on the concerts from Baroque to contemporary music until 1959 in there. He composed his first electronic music work, called 'Music for String Quartet and Audio Tape', in 1957. It is also the first electronic music work of Turkey. The Rockefeller Foundation invited him to work at the Columbia-Princeton Electronic Music Center in 1959. He studied, worked, composed and taught at the CMC from 1959 to 1962. Also he had more advantages than the other composers about the practice of studio equipment. So that he worked firstly with Edgard Varèse on the electronic sections of Varèse's 'Déserts' at the CMC in 1962. Then he came back to Turkey for electronic music studies and aimed to establish studio in Middle East Technical University in 1962. But he did not realize his aims, so he went back to the USA, and also founded the electronic music laboratory at Yale University, where he taught from 1963 to 1970. Also he established the electronic music program at the State University of New York at Stony Brook, where he taught from 1971 until his retirement in 1989. He died in New York. He is one of the CMC's first and Turkey's second-generation composers. Also he is directly the first composer of electronic music in Turkey. Besides electronic works, he composed chamber music, vocal works, and symphonic pieces. Briefly, he has been accepted one of the pioneers of electronic music in the USA and in Turkey. Daria Semegen, Conrad Cummings, and Jing Jing Luo are from his notable students. [7]

Secondly, İlhan Mimaroğlu was born in 1926 in İstanbul. He graduated from Galatasaray High School and Faculty of Law, Ankara University between 1945 and 1949. He worked as a critic, journalist and radio programmer, and learned clarinet under Hayrettin Duygu until 1955 in Ankara. Then he went to New York to study on music with the support of the Rockefeller Scholarship for two-year, where studied musicology at Columbia University under Paul Henry Lang (1901–1991) and composition under Douglas Moore (1893–1969). He was completely settled in New York from 1959 and worked at the Record Hunter as a specialist of repertoire and an art critic at the 'Voice of America Radio'. At the same time he continued his program, called the 'Composers of Our Age', at the Ankara and the İstanbul Radios in New

York. In 1963 he begun to studied on electronic music in the CMC under Vladimir Ussachevsky and on occasions worked with Edgard Varèse and Stefan Wolpe (1902–1972). He taught at Columbia University on electronic music, then he was invited by French Radio and continued his works at Studio of Music Research Center in 1968. Besides being a composer, Mimaroğlu, has also worked as a producer for Atlantic Records, and collaborated with trumpeter Freddie Hubbard on a moving anti-war statement, 'Sing Me a Song of Songmy' in the same year. So that he was awarded the Guggenheim Fellowship in music composition in 1971. He is one of the second generation composers of the CMC and Turkey. He wrote articles and 12 books on music in addition to his compositions from 1960s, currently continues his works in New York. [8]

Arel's and Mimaroğlu's compositions classified in three methods: Firstly, music for acoustic sound and instruments according to certain forms of music. Secondly, music with combination of acoustic and electronic sounds and instruments, and thirdly, completely electronic music. In fact the three methods are valid for majority of the composers of electronic art music.

Conclusion

We can see that electronic art music is one of the first mainstreams and methods of contemporary art music since 1920s. Although it has several methods in several countries, called completely electronic music in the World. This study includes many composers, the works and development on electronic music. However there is need to evaluate some of the information. These can be distinguished such as popular music and art music, sound source and musical instrument, and composer and sound engineer in electronic music. Firstly, electronic music begun primarily in art music, after it has been used in some genres of popular music. While electronic equipment provide a musical background and timbre for popular music, composition's direct tools for art music. Because composer tries to create particularly different sounds in art music. Although some devices, such as the synthesizer and the studio equipment, are common in both music, their aims and creation techniques are different from each other. Secondly, sound source and musical instrument are different, because the Hammond Organ is an electronic musical instrument, but the synthesizer is mostly an electronic sound source. However, these can also be seen as an evolution of the electronic organ from the Telharmonium to the synthesizer. Thirdly, composer and sound engineer are considered differently in electronic music. In fact a composer should used directly the electronic equipment for his works. But a composer cannot use them, a sound engineer applies a composer's musical wishes. So that composer is a creator, as for sound engineer is a practitioner. Some composers worked both as a composer and sound engineer such as Arel and Mathews. So that they had more advantages than the other composers. In this context, many composers of electronic music composed directly their works with the equipment. The other evaluation is about listeners of electronic music that Stockhausen evaluated "In 1967, just following the world premiere of 'Hymnen,' [...] Many listeners have projected that strange new music which they experienced into extraterrestrial space. Even though they are not familiar with it through human experience, they identify it with the fantastic dream world. Several have commented that my electronic music sounds 'like on a different star' or 'like in outer space." [9] In second section, although Arel and Mimaroğlu are the pioneers of electronic art music from Turkey, there is no other composer of electronic art music in their period. Because the other composers of Turkey were not interested enough. But some young composers studied on electronic music from Turkey.

References and Notes:

1. *T. Holmes, Electronic and Experimental Music: Technology, Music, and Culture (New York: Routledge, 2008).*
2. *R. J. Gluck, "The Columbia-Princeton Electronic Music Center: Educating International Composers," in Computer Music Journal, no. 31 (2007): 20-39.*
3. *İ. Mimaroğlu, Elektronik Müzik (İstanbul: Pan Yayıncılık, 1991), 22-25.*
4. *M. Fogle, "Understanding Electronic Music: A Phenomenological Approach" (PhD diss., Florida State University, 2009): 16.*
5. *T. Pinch and F. Trocco, Analog Days: The Invention ansd Impact of the Moog Synthesizer (USA: Harvard University Press, 2002).*
6. *R. Rowe, Machine Musicianship (USA: Massachusetts Institute of Technology, 2001).*
7. *F. Ali, Elektronik Müziğin Öncüsü Bülent Arel (İstanbul: İş Bankası Kültür Yayınları, 2002).*
8. *E. İlyasoğlu, 71 Turkish Composers (İstanbul: Pan Yayıncılık, 2007), 115-120.*
9. *T. Holmes, Electronic and Experimental Music: Pioneers in Technology and Composition (New York: Routledge, 2002), 145*.

SOLAR ARTWORKS

Nacho Zamora

Solar artworks combines art, architecture, design, science, and a common objective: how to make our cities more sustainable through public art. In this conference we will see some of the most interesting examples of solar artworks studied in the frame of The Solar Artworks Project to date, in particular how different the projects can be, and why they have been created.

The Solar Artworks Project. http://www.solarartworks.com

Introduction

The Solar Artworks Project arises as an answer to this question: What can public art do to give something back to public in the context of the XXI Century urban landscape.

Solar artworks are an illustrative example of how far could go the relationship between art, architecture and the new technologies related to renewable energies, in this particular case, solar power.

These artworks provide an aesthetic attraction to the place where are constructed and, at the same time, they use their capability to produce solar power and employ it.

Almost all solar artworks designers have a common objective: how to make our cities more sustainable through public art. We can find designers from different parts of the world, and they are generally multi-disciplinary groups of specialists.

In this conference, I would like to talk about several examples of solar artworks that I have studied within this research project. We are going to see how different the projects can be, and the opinion of their designers about key aspects of these artworks.

Solar Sail, by The Solarsail Society**,** created in 1998 in Müsingen (Switzerland), was the first solar artwork that I found, when I was searching for information about these projects.

I was very impressed, because this kind of work was completely different from the public artworks that I had studied before in my career.

Solar Sail improved the aesthetic conditions of its location and, at the same time, this work provides clean energy for a building.

Stephan Kormann, from The Solar Sail Society, describes the advantages of this artwork:

"The elegant shape of the sail is a metaphor for movement and lightness. It stands as a symbol for the sympathetic treatment of the fundamentals of our lives." [1]

Since then, I have been collecting information about these works and their designers, shaping the Solar Artworks Project.

I'm going to talk about several examples of solar artworks, classified according to, in my opinion, their most relevant contribution to the public spaces where they have been built.

New aesthetic proposals

We can see physical characteristics which make them different from "traditional" public art.

I consider these qualities as a new aesthetic kind of proposal.

The temporary project *The Verdant Walk* by the Canadian The North Design Office, created in the United States, offered another point of view on a city place at night.

This work reminds us of the industrial origins of the city of Cleveland, and the strong promotion of renewable energies by the local government.

In addition to the sculptures, The Verdant Walk restored a large space, called Mall B, recuperating native grasses from different parts of local landscapes in the area.

Alissa North, one of the designers, say about the reaction of the people with this work:

"Visitors were attracted to the forms, children and adults, wanting to come up to them and touch them. People were intrigued by the solar aspect, and were interested to understand this component of the project." [2]

Interaction

Perhaps the interactive factor is the next step to explore within public art. Solar artworks offer a great opportunity to research and develop participative ideas, involving citizens within the creative process.

Solar Collector, by Gorbet Design, is completely interactive with the public.

Located in a traffic island in Cambridge, Ontario, Canada, this work provides citizens with the possibility to interact with the sculpture, giving them the opportunity to change the look of the lights and create their own performance each night, by using simple computer commands at the sculpture's website.

Matt Gorbet, one of the creators of *Solar Collector* said:

"By collecting the creative output of people during the day along with the sun's energy, and combining them into a graceful nightly performance, the piece connects people to the power and beauty of nature."[3]

Educational intention

One other objective that almost all these works have is an educational intention. In this sense, solar artworks invite us to learn, to be curious, and concerned about the environment.

Rein Triefeldt has been developing solar artworks for more than a decade. Triefeldt's work is an example of how art can be a good way to impart knowledge about the qualities of the renewable energies for new generations. This artist has provided workshops for students regarding art and sustainability projects.

He thinks that:

"Solar artworks can generate public dialogue*, addressing and even resolving community problems."* [4]

Triefeldt is founder of the *Solar Tree Project*, an educational proposal in which they:

"seek to give participating students primary knowledge in the field of solar energy and practical experience in design and creation of fine art and sculpture." [5]

Hybrid projects

Solar Artworks are, first of all, an extensive field where their designers are looking to innovate with new materials and their applications. Architecture and art find new ways of collaboration with hybrid projects that combine the best of each other.

The New York studio SMIT**,** has developed the project *Solar Ivy.*

Inspired by the Ivy leaf, this work can be adapted to almost any kind of vertical structure. Each leaf is an independent solar power sensor, and the total energy produced depends on the quantity of leaves in

the installation. This work offers many possibilities of configuration, design, functionality and adaptability, mixed into a product that is currently available today.

Samuel Cochran, one of the founders of SMIT, says about their work:

"Solar Ivy is functional in its purpose and artistic in its drive to change the connotation of what a solar panel can be." [6]

Message of Solidarity

As we have already seen, solar artworks can be used in many different applications. We have also recognized the objective of solar artworks' designers, to spread a sustainable message.

The work of Alexandre Dang, maybe is an exception within this group of artworks, closer to a temporary installation than a piece of public art. Dang has created many different versions of *The Dang'cing Flowers* around the world.

In common with all the particular characteristics of his installations, this work presents a whimsical vision of the necessity to incorporate renewables energies within our lives.

However, *The Dang'cing Flowers* have a strong power of attraction for everyone who sees them in motion, having an hypnotic effect on the public.

The meaning of Dang's work, and the initiative that he represents, *Solar Solidarity International,* are looking for a better future in which the use of new green technologies, are synonymous with sustainable development.

Organizations

We can find several interesting organizations that are dedicated to research, promotion and some even produce projects which could be considered solar artworks. However, it's difficult to find an initiative more committed to this issue than *The Land Art Generator.*

The Land Art Generator Initiative is, today, the perfect example of the public art research centre of the future. This project, created by Elizabeth Monoian and Robert Ferry, has become a reference for all those who want to learn about the possibilities of combining public art, architecture and renewable energies.

This organization is also a platform for artists, architects and designers who want to innovate with their work, by providing them with an exclusive space on the Internet.

The competition which *The Land Art Generator* organizes, held in 2010 in Dubai and to be held next January 2011 in New York City, is an opportunity, not only because of the innovative projects that we can expect to find, but also because the events take place in large public spaces, aiming to transform them into:

"a symbol of renewal and an expression of how our society can restore balance to its landscape." [7]

Some Conclusions

With these examples of solar artworks, we have seen that, although these works are in an early stages of their existence, we can anticipate spectacular projects in the coming years.

The evolution of solar artworks will be determined by the artistic vision of their designers as well as by the advances that we expect in the field of solar power technology.

In addition, we can extract some final conclusions:

Solar artworks are a completely new artistic product. Far removed from the public art that we have seen before.

There is an international artistic movement of artists, architects and designers, whose artworks are being planned for some of the most emblematic places of modern architecture.

Solar artworks are an excellent means for governments to increase public awareness about the value of renewable energies.

These works are functional, original and technologically advanced models of self-sufficiency within the urban landscape.

Solar artworks remind the observer of the compromise with and respect for our environment.

Although we can say that solar artworks remain great unknowns, It is certain that, step by step, these works will become part of the urban landscape in our cities.

Solar artworks offer a wide range of possibilities and attractions that should be taken into account by governments when they invest in the public art of the XXI century.

You can find all the most interesting information about this research project on the project's web-site: www.solarartworks.com

References and Notes:

1. Stephan Kormann, "Energy Extra 3.04 Report," June, 2004, http://solarsail.ch/publikationen/ (accessed August 1, 2011).
2. Alissa North, "Interview for The Solar Artworks Project," April, 2011, http://www.solarartworks.com/index.php?option=com_content&view=article&id=83&Itemid=120&lang=en (accessed August 1, 2011).
3. Matt Gorbet, "Interview for The Solar Artworks Project," November, 2009, http://www.solarartworks.com/index.php?option=com_content&view=article&id=84&Itemid=131&lang=en (accessed August 1, 2011).
4. Rein Triefeldt, "Interview for The Solar Artworks Project," November, 2010, http://www.solarartworks.com/index.php?option=com_content&view=article&id=73&Itemid=123&lang=en (accessed August 1, 2011).
5. Rein Triefeldt, "Interview for The Solar Artworks Project," November, 2010, http://www.solarartworks.com/index.php?option=com_content&view=article&id=73&Itemid=123&lang=en (accessed August 1, 2011).
6. Samuel Cochran, "Interview for The Solar Artworks Project," February, 2011, http://www.solarartworks.com/index.php?option=com_content&view=article&id=76&Itemid=119&lang=en (accessed August 1, 2011).
7. Extracted from the Land Art Generator Initiative Web Site, "Competition Section," August, 2011, http://www.landartgenerator.org/competition.html (accessed August 1, 2011).

REMIX CULTURES AND THE IMAGINING OF ALTERNATIVE INTELLECTUAL PROPERTY POLICIES

Martin Zeilinger

In theory, legal taxonomies acknowledge how creative, productive, and beneficial remixing practices can be. This does not reflect the realities of how such law is enforced, however. This paper is concerned with how creative practitioners and users deal with this problem. I argue that it is in the lived praxis of remixing communities that 'para-legal' contexts which challenge traditional intellectual property policies are established.

In this era of easily copyable and flawlessly reproducible digital information, a never-ending profusion of news items, online postings, and academic writing focuses on the complications and quandaries that arise whenever remixing activities interface with the legal apparatuses currently in place to safeguard the materials to be remixed. These accounts, whether they cover legal complaints, artistic practices, or tech news, may touch on everything from audio mashups, fan fiction and machinima to web-apps combining the functionality of multiple online services, modded video game consoles and hacked games, art projects drawing on scientific data visualization methods, and business ventures that remix traditional production processes. True to the beautifully open-ended idea of recombinant creativity, there is no limit to the possibilities of what can be remixed, and of the forms that remixes may take. However, the consequences of all these remixing practices tend to be much less broadly envisioned. In more or less detail and with ranging measures of precision, discussions of remixing practices invariably invoke various aspects of intellectual property (IP) law, most commonly the spectre of copyright infringement. Often, this is done to the effect of stating that the remixes in question either 'have been,' 'should be,' or 'could easily be' prosecuted for IP violations.

The haziness and inaccuracies of such discussions, which may condemn legitimate users as thieves, or, conversely, praise thieves as open access advocates, often reflect the fact that most national and international IP regimes currently have no truly fair methods for sanctioning certain types of remixes while properly classifying others as wrongful. In theory, legal systems acknowledge how creative, productive, and beneficial remixing practices can be – after all, most IP law is explicitly understood to encourage learning and the arts. But this does not at all reflect the realities of how such laws are enforced. This paper is concerned with how practitioners and users deal with this problem.

In many creative remix practices, we can observe a general unwillingness to acknowledge the relevance of IP law for interpreting certain creative activities and expressions. Consequently, I argue, such practices often seek to establish extra-juridical or 'para-legal' contexts which challenge traditional IP policies by creating alternatives that foreground the common and the collective rather than the concept of property. It is in the lived praxis of these alternatives that some of the most elaborate critiques of the shortcomings of existing IP law may be found.

In part because of dated Copyright Acts featuring vague and unrefined 'fair use' and 'fair dealing' doctrines, remixing is often improperly linked with property violations. As a result, there is much confusion

concerning what does or should constitute a permissible remixing practice. This is certainly complicated by the fact that today, virtually all digital activities heavily rely on a core feature of remixing, namely the copying and reusing of bits of information. Add to this the effortlessness with which everyday users have adopted all manners of cut-and-paste techniques, and it comes as little surprise that in the popular imagination expressed in news media and online, there often remains little difference between relatively distinct practices. Take, for example, the reshuffling of digital code practiced by sampling artist Gregg Gillis (aka Girl Talk), legendary for cramming 322 individual, copyrighted samples into 14 radio-length mashups on his 2008 album Feed the Animals without securing licenses, and the reshuffling of digital code practiced by hacker George Hotz (aka geohot), who opened up Sony's PS3 gaming console to home-brew software in 2010. A variety of perspectives on this comparison are conceivable: 1) Both practitioners could be criticized for interfering with the integrity of IP-protected, authored content. 2) Hotz's hacking and Gillis's sampling might be seen as unrelated, the former willfully damaging the value of IP, the latter constituting a creative compositional act. 3) The same distinction could hold if we were to switch the roles of geohot and Girl Talk in this last argument. 4) Finally, the activities of both practitioners could be justified by arguing that their recodings are conducted in the spirit of openness and sharing, and for public benefit rather than for commercial purposes (the expressions of both remixers encourage active, creative use of otherwise restricted cultural commodities).

While none of these perspectives have been legally tested (Girl Talk has yet to be sued for copyright infringement; geohot has settled with Sony out of court), there is some validity to all the opinions they express. Indeed, both geohot and Girl Talk have been typecast as both copyright villains and fair use activists. More and more, legal systems are pushed to acknowledge such uncertainty and their inability to adequately respond to it. Meanwhile, creative communities around the globe move on to explore their own solutions to the problem of how go regulate which remixes are permissible and which aren't. Much can be learned from the ways in which remix practitioners and activists are beginning to respond to the inadequacies of current IP law. Rather than seeking to frame creative practices of remixing in existing IP regimes, I propose we must acknowledge that the communities forming around such unfairly marginalized activities already produce principles and ethical codes of collaborative, appropriation-based creativity and sharing.

Beyond gaining due legitimacy, these activities and the ethics they produce have also yet to be recognized as a valuable component of cultural policy reform initiatives. In the complexities which arise when current IP discourse collides with new creative practices fundamentally based on the appropriation and reuse of IP-protected materials, we can find long lists of the ambivalences and confusion around the legality of remixing culture. Part of the intrinsic value of appropriation-based creative practices conducted in the spirit of open access and the circulation of cultural expressions and knowledge, I believe, is that they produce this confusion and thus demonstrate the inability of traditional IP law to deal with it. One tactic of creative communities, in other words, is to show how tragically out of step current IP law is with the tendencies, desires, and, quite simply, realities of present-day remix culture.

Discussions of remixing culture frequently foreground the potential legal repercussions remixing can entail. Yet, notwithstanding threats of litigation or fines, remixing is ubiquitous to a degree that might be astonishing if it weren't for the fact that digital media environments are inherently designed to facilitate the copying, sharing and reusing practices on which remixes rely. In light of this, national and international IP regimes have generally proven unable to properly address questions of the permissibility of remixing. A growing body of scholarships is highly critical of the direction IP law is taking, and challenges the rationale that IP laws stimulate and incentivizes cultural creativity, showing, instead, that they limit it. Similar arguments have been made in more mainstream venues, such as in Brett Gaylor's 2008 open

source documentary RIP! A Remix Manifesto. Such critiques, and the creative practices of appropriation and remixing they commend, indicate that regimes of IP law are facing crises of legitimacy and relevance. Official responses to these crises are in short supply, and often inadequate. To give one example, last June the Canadian Parliament tabled an amendment (Bill C-32) to its Copyright Act that would adopt a number of positive changes to its fair dealing provision, while at the same time including new provisions that would criminalize the circumvention of digital rights management (DRM) software – a move that essentially reverses the proposed expansion of permissible copying and remixing.

Developments of this kind have long driven creative practitioners and their advocates both into the underground and to activist fronts. Groups such as the Canadian Appropriation Art Coalition work to raise awareness concerning the impracticality of current IP laws, and highlight recommendations of changes to existing laws based on the experiments of artists and activists. But the fact remains that to creative practitioners and everyday users, to the remixers of the world, lobbying for meaningful legal reform has proven tedious and ineffective. Often, establishing more radical, independent alternatives which operate in the shadow of existing IP regimes appears as the more practical direction to take. Common to most such alternatives – whether they take the shape of individual artists' projects or organized groups – is the assumption that the remixes in question must be permissible as a matter of principle, i.e., that alternative models for fairly regulating copying and circulation of protected cultural matter must be pursued primarily because existing fair use and fair dealing exemptions fail to do so.

While efforts of practitioners and activists to establish fair copying and remixing cultures 'outside' of IP law have drawn the attention of academic communities, comprehensive investigations of alternative systems governing creative exchange and remixes have not been conducted. Studies on the successes of developments such as Creative Commons can be bracketed here, considering that this movement has been criticized of simply promoting a continuation of copyright by other means; see, e.g., Berry and Moss 2005. In this sense, the Creative Commons licensing system's resistance to the limitations imposed by conventional IP law on remix culture may be described as a defeatist approach which advances by layering an already restrictive system with further rules.

In comparison, much of the resistance emerging in creative communities of mashup artists, fan fiction writers, coders, or machinima artists operates, rather, through what we might call 'para-legal' sites and channels that allow for the more immediate, vernacular negotiation of moral codes and new ethics of the permissibility of copying and remixing practices (see Zeilinger, forthcoming).

An example of this approach is the practice of media artist and activist Kenneth Goldsmith, founder of Ubuweb (www.ubu.com), perhaps the most popular free digital repository of experimental art. Goldsmith tends to ignore the possibility that some of his reusing practices are illegal, and generally insists that his 'dealings' are always 'fair' even when they don't conform to the rules outlined in copyright laws, i.e., that there is no reason why his activities of making copyrighted works freely available should be considered as infringement. If contacted by content owners, Goldsmith proceeds by entering into personal correspondences with them, during which, by arguing that he broadens their audiences and does not interfere with their commercial interests, he is usually able to win them over to the ethics of his activities (Goldsmith, forthcoming).

Many communities of remixing practitioners follow similar tactics of 'copy first, ask later,' but often add into the mix what amounts to complex, if informal, codes of conduct governing matters of the access to and reuse of remixed works. The vibrant chipmusic community, for example, many of whose members repurpose obsolete but patented video game hardware to synthesize and sample recognizable sounds,

generally follows a series of informally agreed-upon rules established on popular online fora. Transgression of these rules and misappropriation of material produced by members of the community are dealt with in the online exchange of comments and opinions, involving creators, offenders and audiences. Conventional IP law is hardly ever invoked, and these informal negotiations are surprisingly effective in establishing a fair system of access and exchange among creators (Zeilinger, op. cit.). Similar practices have emerged in communities of machinima artists (Horwatt 2010), or also in the exploding mashup scene (McGranaham 2010). Rather than choosing the path of litigation, members of these communities frequently prefer to discuss their concerns with offenders, or denounce or ridicule breaches of the various codes of conduct to which they subscribe. For example, when punk pioneer Malcom McLaren sought to co-opt the burgeoning chipmusic scene as 'his' discovery, members of the chipmusic community voiced their grievances in a widely publicized open letter that helped to solidify the community's sense of identity and the artform as such (gwEm 2004). Creative communities also tend to foreground links to ideals of collaboration, sharing and exchange as known from open source programming culture, hacking culture, and the now defunct 'demoscene' of the 1970s and 1980, which, too, functioned according to unwritten codes of conduct that in turn strongly influenced open source programming.

As noted, remix practitioners often display unwillingness to acknowledge the relevance of IP law for their activities as a matter of principle. A good example for this unwillingness is Richard Stallman's work, where it is linked to the issue of genetics and bio-engineering. As Stallman, well known as the founder of the GNU project and the Free Software Foundation, notes, admitting broad applicability of IP law can substantially complicate any resistance to misconceptualizations of copying processes. To make his point Stallman cites the appropriation of traditional knowledge and its 'remixing' as patentable procedures or medical agents. While such activities must be condemned for effectively shifting collective cultural practices and knowledge from the public domain into the domain of IP law, it should, argues Stallman, never be defined as theft or piracy: "The 'biopiracy' concept presupposes that natural plant and animal varieties, and human genes, have an owner as a matter of natural right. Once that assumption is granted, it is hard to question the idea that an artificial variety, gene, or drug is property of the biotech company by natural right" (Stallman 2005: 170).

In the same vein, many creative practitioners are concerned that there lies danger in allowing their remixing practices to be co-opted by conventional property-based IP discourse, because once that happens, all their actions will have to accept as a relevant context the restrictions and limitations imposed by existing copyright regimes. It is easy to see, then, why creative practitioners and everyday users who seek to acknowledge copying, sharing, remixing as a quasi-universal human tendency (discussed, for example, in Boon 2010) are often unwilling to adopt rules which supplement, rather than supersede IP law. Instead of simply shifting the enclosures which IP law represents, qualitatively different approaches are needed.

With the exception of fan fiction communities, comprehensive studies on viable alternatives in creative communities are few and far between. Some work has been done on the contemporary mashup scene, on relevant aspects of chipmusic communities, as well as on machinima communities. But these examples of critical inquiries have not begun to adequately address larger questions of how the different practices they consider fit into a broad discourse regarding the general permissibility of remixing in our contemporary cultural landscapes. Some foreground discussion of remix aesthetics over legal and sociopolitical aspects, some interpret resistance to limiting legal systems as a negation of copyright, and some simply test how existing remix forms would fare in hypothetical confrontation with current IP laws. I contend that more useful perspectives can be found by considering the critical commentary of

remix practitioners itself, and to treat their practices, tactics and techniques as a performance of new remix theories.

Many contemporary remix communities are well organized and have established extensive platforms where works, ideas, and methodologies are shared, discussed and exchanged. It is to these platforms of creative production, collaboration and exchange that we have to look in order to understand what remixing means today, which ethics and moral values are attached to it, and how remixing is already systematically validated and legitimized outside the law. Here, the reproductive qualities of digital media – i.e., their inherent copyability, the fundamentals of remixing – are properly explored as a democratization of culture, rather than as an economic threat to fenced-off property systems. This insistence on the inherent positive value of copying and sharing always resists the enclosure of creativity by IP policies that are based on profit-driven models of private property, and it is here that we can find discursive frameworks which can provide real alternatives to conventional IP and copyright law.

However, remix communities appear hesitant to conceptualize and provide such frameworks. It may be up to researchers and activists to demonstrate that cultural practices which insist on the merits of sharing and copying should be framed in a new positive rhetoric, for example of civil liberties, human rights, or moral economy. Only then will it be possible to conceptualize creative resistance to existing IP law not as indirectly confirming the validity of profit-oriented IP regimes (i.e., theft as a challenge to property), but to link such resistance to fundamental rights which property-based legal regimes can't easily acknowledge, including the freedom of expression, the freedom of access to information, or the freedom to receive and impart information and ideas (as outlined, e.g., in the Universal Declaration of Human Rights). As such, the actual practices of and discussions among present-day remixers suggest that a moral economy or a human rights framework may be most suitable for negotiating how to balance new digital-environment abilities to copy, collaborate and share with universal desires for rights to creatively participate in cultural life, for open access to informational goods, and for rights to cross-cultural exchange and cultural diversity. Taking existing remixing practices seriously, in other words, will inevitably push existing national and transnational doctrines of fair use and fair dealing to their limits, and will demonstrate the urgent need for policies that honor inherent values of sharing and collaboration over the monetary worth of culture-as-property.

It appears that revised and updated permutations of existing IP law can only recast, rather than remove, the restrictions which property-based legal discourse imposes on universal creative drives. Thus we must insist that emergent forms of digital cultural appropriation are not merely seen to create new forms of legal offence and injury, but rather new, experimental ethics of digital practice and new forms of respectful dialogue. My focus in this short paper has been on how crucial it is to accept domains of collaborative creativity and cultural exchange as evolving extra-juridical systems that are based upon norms, mores and conventions operating outside the logic of intellectual property. Rather than exploring how to 'fairly' embed remixing communities in existing IP schemes, we need to show how creative practitioners are able – and have always been able – to withstand assimilation by expansive ideologies pushing property-based legal regimes and to forge alternative practices in their shadow. We may be a far way off from proposing coherent alternatives to existing, flawed intellectual property regimes. For now, it is a good start to acknowledge that already existing sites of resistant, fluid remixing practices represent the true laboratories of legal reform.

References and Notes:

Berry, David & Giles Moss. "On the 'Creative Commons': a critique of the commons without commonalty." http://www.freesoftwaremagazine.com/articles/commons_without_commonality (accessed September 10, 2011).

Boon, Marcus. In Praise of Copying. Cambridge: Harvard University Press, 2010.

Goldsmith, Kenneth. "Robin Hood of the Avant-garde." in Dynamic Fair Dealing. Creating Canadian Culture Online. Eds. Rosemary J. Coombe, Darren Wershler & Martin Zeilinger (under submission to University of Toronto Press).

gwEm. 2004. "Open Letter to Malcom Mclaren." http://micromusic.net/public_letter_gwEm.html (accessed September 10, 2011).

Horwatt, Eli. "New Media Resistance: machinima and the avant-garde." Journal of the Imaginary & Fantastic 2.1 (2010): n.p.

McGranaham, Liam. "Mashnography: Creativity, Consumption, and Copyright in the Mashup Community." Dissertation. Brown University, 2010.

Reynolds, Graham. "All the Game's a Stage: Machinima and Copyright in Canada." The Journal of World Intellectual Property 13.6 (2010): 729-743.

Stallman, Richard. "Biopiracy Or Bioprivateering?" In Information Ethics: Privacy, Property, and Power. ed. Adam D. Moore. Seattle: University of Washington Press, 2005, 169-71.

Zeilinger, Martin. "Chipmusic, Out of Tune: Crystal Castles and the Misappropriation of Licensed Sounds." in Dynamic Fair Dealing. Creating Canadian Culture Online. Eds. Rosemary J. Coombe, Darren Wershler & Martin Zeilinger (under submission to University of Toronto Press).

USERS BECOME RE-CREATORS: ENHANCING EXPERIENCES THROUGH MAPPING

Anja Zeising & Dennis Krannich

In this paper, we present a new understanding of interactive installations that goes beyond action-reaction communication between actor and installation. The goal is to enhance the user's experience and engagement as well as the reflection about the creator's initial intention. We employ "Mapping" as method to redefine the user's role from consumer to "re-creator" within a specified scope, set by the creator.
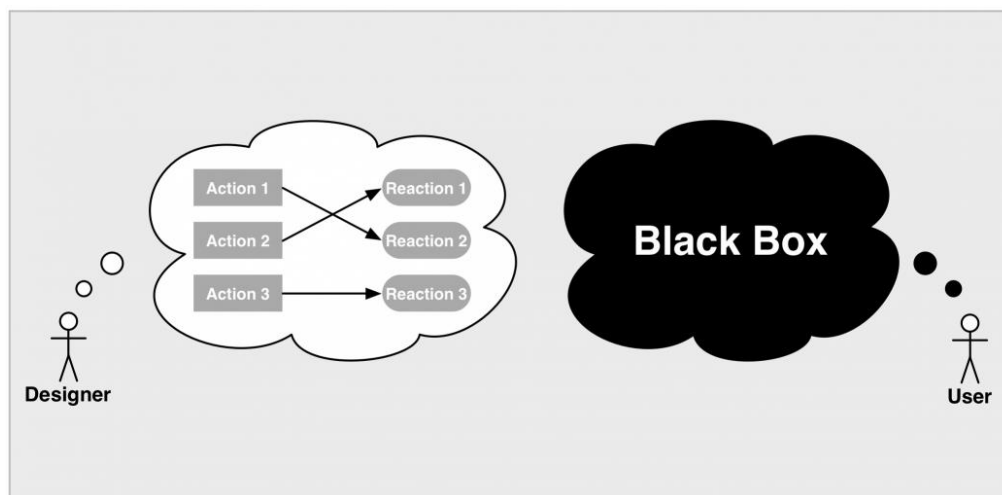
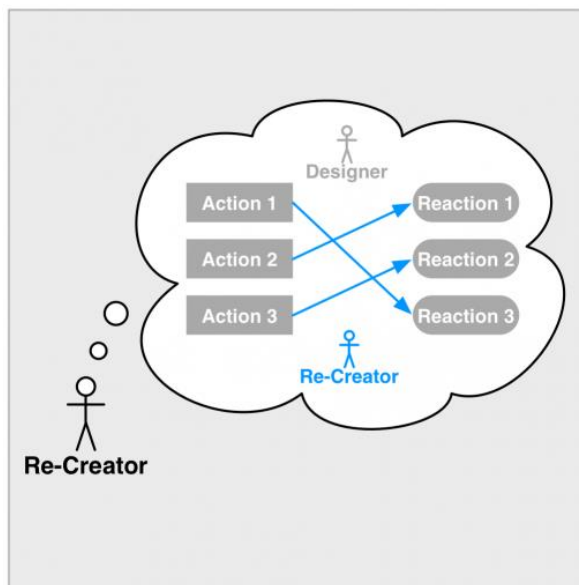*Fig. 1: The designer's and active user's role in traditional interactive media art work.*

Fig. 2: Dynamic mapping concept - the user become a re-creator.

Introduction

On the crossroads of technology and arts, we consider User Experience Design as a promising approach to empower the design process of media art pieces and ensure the actors' engagement and reflection. We focus on interactive installations as media art pieces; the actor provokes a system's reaction by his actions (e.g. full body movement).

Since most installations only provide a closed action-reaction framework – some employ programmed randomness to include surprising moments – we argue towards a new understanding of the actor's role. The goal is to enhance the user's experience by creating a deeper engagement and immersion on the one side and a reflection process on the other side.

Digital Experience Design

In context of HCI, works like "User Experience with the CYBER graphics terminal" (1974) from Edwards & Kasik have constituted the term user experience for the first time. [1] During the 80s the term was rarely used. In the 90s its popularity started again with the movement of Don Norman ("User Experience Architect"). Since the new millennium, the term user experience is spread through various disciplines in the field of HCI. Hence, the quality of a digital product does not rely on usability only, but also on aspects like aesthetics and emotional bonding. In the near future previously separated disciplines will merge due to the shift from performance- and task-oriented systems to experiences with and through digital products. [2]

Hassenzahl says: „[...] experience emerges from the intertwined works of perception, action, motivation, emotion, and cognition in dialogue with the world (place, time, people, and objects). It is crucial to view experience as the consequence of the interplay of many different systems. [...] While many processes together produce experience, emotion is at its heart and has an accentuated position. One may go as far as saying that emotion is the very language of experience." [3]

According to this, our understanding of experience is a stream of thinking, acting, feeling, rating and reflecting of external and internal influences. It is an inner self-reflection. An experience is a composition of this stream into a closed and personally meaningful entity. Experiences give our actions meaning, they are remembered, communicated and act as a motivator or de-motivator. It can be named precisely and has a start and end point. As a matter of this, an experience changes over time.

Besides taking a look at experiences on a meta-level, it is also important to take a look at the particular factors that are directly related to our interaction with digital products, because user experience design does not only involve the product, but also the user, their activities and the context in which the interaction takes place. We understand user experience as a symbiosis of these four basic elements. As a matter of this, we extend the term experience design by the word *digital* to *Digital Experience Design* to accentuate the interaction with a digital product. The use of a digital product in contrary to analog products is essential for the general framework of interaction. Therefore we stress on this particular aspect.

The *Digital User Experience* is based on four key aspects: the characteristics of the product, the user, the activities and the context of use. The digital product is characterized by its tangible (pragmatic) and intangible (hedonic) qualities. The appraisal of functionality, performance and usability takes place on an

objective level, whereas beauty, emotion and meaning take place on a subjective level. The user is driven in particular by his intentions (goals), perception, (pre-) knowledge and culture. In this process, self-reflection and perception/cognition takes place. The user evaluates and rates the own acting and the experience as well as compares the current experience with previous ones. Before the user interacts with a product he has expectations of the product (expected experience). This experience will change over time. The user starts with some expectations before the first contact with the product, which he might have gotten from product description, photos/videos or review. During the use, these expectations can be met or not. Based on these experiences new expectations evolve. After the use a first opinion is created and new expectations for future interaction/use arise. Places and spaces, their objects and people (subjects), events and environmental influences (e. g. light and weather) characterize the context of use. An essential factor is the time, because all characteristics of the context and activities depend on it; they can change during the day and over months and years. This does also include the requirements and needs of the user; they also change over time. Consequently, it is only possible to measure the user experience at a given point in time.

In conclusion we can say, that user experience is a dynamic phenomenon, which changes over time and influences or future experiences. The context of use influences the user, the activity and the digital product. Thus, the experience can be influenced for example by poor lighting conditions, that result in reflections on the screen, the activity by tight and crowded places and spaces, and the user can be distracted by high traffic, pedestrians or other objects (e.g. vehicles in road traffic). An activity provides the connection between the digital product, the user and the usage context.

Mapping to enhance experiences and reflexion

to map: to assign (as a set or element) in a mathematical or exact correspondence <map picture elements to video memory> (Source: Merriam-Webster.com) [4]

With the term mapping we refer to the process of assigning a set of controls to a given functionality of an installation to modify the action-reaction principle of an installation. This gives the creator the possibility to enhance the interaction and user experience.

"Interactions are reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another."[5] Thus, the user can influence a process and change the systems' behavior. However, the interaction is limited to a set of rules, defined by the creator. Mapping on the other side modifies or enhances these fixed rules of interaction. It makes decisions about if, when, and how to respond to incoming inputs or which channel to use for the response. Additionally mapping is always connected to a certain topic (e.g. movement, sound). It builds in itself a closed entity.

More in general, a distinction can be made between installations in which a continuous mapping of action (input) onto reaction (outputs) is used and installations in which a sort of dialog takes place. These two conditions can be thought as boundaries of a continuum of possible interactions. According to this, we can distinguish two different types of mapping: 1. direct mapping implies some kind of directness in the action-reaction process without any dynamics; 2. indirect mapping includes some kind of logical model or reasoning that selects a reaction-algorithm in correspondence to the current context. Hence the reaction is selected from a collection of possible reactions. Due to this static concept the user experience decreases when the user fully understood the underlying mapping rules.

Therefore we propose to change the role of the actor from an active user to an active re-creator. A re-creator is empowered to manipulate the mapping rules, which allows her/him to reflect on technology, aesthetics and experience. Technology becomes a visible artifact of the installation. Performing the mapping process motivates the re-creator to explore the action-reaction framework and underlying rules. Adding personal meaning enhances the experience even more.

In traditional interactive media art works the designer defines a set of actions and reactions and maps them according to the designer's mental concept (see fig. 1). The user on the other side perceives the installation as a black box. He/she has to figure out how the installation works (action → reaction) and how the designer applied the mapping. With the lack of modifying the mapping, his/her experience of interacting with the installation is decreased. This can lead to one of the following three states: The user gets bored: He/she has figured out the installation's underlying concept and mapping; any further interaction is boring; the interaction time is too limited/short. The user gets unexcited: He/she understands the static installation concept, but its static behavior makes the interaction unexciting. The user gets frustrated: He/she cannot find out or understand the installation's underlying concept and mapping.

By applying an dynamic mapping concepts to the interactive media art work, the designer's and user's role are changed (see fig. 2):

The designer still creates a set of actions and reactions, as well as a mapping (as shown in figure 1), but in addition he/she defines certain rules and boundaries. The designer defines the different perspectives of the installation in order to reflect upon its being and purpose. He/she can adjust this experience by defining the boundaries of the mapping. The re-creator exploits the installation and modifies the mapping within the given scope through an additional interface.

However it is always a tightrope walk between level of freedom and level of art. The more mapping is applied, the more the designer divulges the installation to the user. On the other side, the less mapping is applied, the more the installation can focus on a certain aspect.

An Example: Der Schwarm

Some examples of mapping are presented in the installation Der Schwarm. [6] A flock of swarming light spots projected on the floor reacts to free body movements. The response of the swarm intelligence to the movement of the interacting user is represented through behavioral patterns. A pattern defines a set of swarm parameters such as movement direction, velocity and graphical representation. Free body movements are tracked and its velocity and position are mapped to the flock's behavioral patterns and position. Quick movements by the user evoke a fleeing or aggressive flock of light spots, while slow movements make the light spots react calm and friendly.

An enhancement of the installation Der Schwarm is an auditory display [7] that creates sound, every swarm particle creates a sound. The mapping is realized through the employment of Albert Mehrabian's three-dimensional emotion model (PAD), which has advantageous properties for digital systems and is already been applied to link properties of sound and emotions. [8] [9] Mehrabian's representation oriented system is defined through the axes valence (pleasure vs. displeasure), arousal (arousal vs. non-arousal) and control (dominance vs. submissiveness). [10] At first we mapped three major swarm behavior parameters to the axes of the PAD model. Then we assigned three sound parameters to the axes. The result is one possible mapping of swarm behavior parameters to sound parameters. An interface

enables the user to modify the mapping, so any combination of the three swarm behavior and sound parameters is manually adjustable.

In this example the user becomes a re-creator. S/he is enabled to change the mapping within a defined scope and explore its effects by full body interaction. The re-creator on the one hand can modify the underlying mapping rules and understand the installation's basic idea. The re-creator's empowerment to configure certain functions and manipulate the action-reaction framework of the installation can foster hers/his experience. On the other hand, the designer is enabled to provide restricted insights into his media art pieces. This allows her/him to draw the re-creator's attention to certain parts of the installation to deliver her/his intending message.

Conclusion

In this paper we have proposed a new concept for enhancing the user experience with interactive installations. With the installation Der Schwarm we have a proof-of-concept. Applying this approach allows an enhanced experience for the actor and provides new possibilities for the creator to reach the actor. The actor becomes a part of the whole process (not the product). Thus we are not only able to enhance the experience, but also to strengthen the engagement of the user with the installation as well as the immersion and reflection.

References and Notes:

1. E. C. Edwards, and D. J. Kasik, "User Experience with the CYBER Graphics Terminal," *Proceedings of VIM-21, Denver (October 1974)*.
2. D. Krannich, *Mobile System Design (Norderstedt: BoD GmbH,2010)*, 126.
3. M. Hassenzahl, *Experience Design: Technology for All the Right Reasons (San Francisco: Morgan & Claypool, 2010)*, 4.
4. Merriam-Webster Dictionary Web Site, http://www.merriam-webster.com/dictionary/map (accessed May 24, 2012).
5. E. D. Wagner, "In Support of a Function Definition of Interaction," in *The American Journal of Distance Education 8, no. 2 (1994)*.
6. A. Hashagen, H. Schelhowe, and H. Seelig, "'Der Schwarm' - An Example for Interaction of Computer Science and Performance Studies," *Proceedings of ISEA2008, Singapore (July-August 2008)*.
7. A. Hashagen, N. Hajinejad, and H. Schelhowe, "Dancing Sound: Swarm Intelligence Based Sound Composition through Free Body Movements," *Proceedings of ISEA 2009, Northern Ireland, (August-September 2009)*.
8. C. Peter, "Emotion Models and their Implications for System Design," in *Emotion in HCI: Joint Proceedings of the 2005, 2006, and 2007 International Workshops (Stuttgart: Fraunhofer IRB Verlag, 2008)*.
9. J. Loviscach, and D. Oswald, "In the Mood: Tagging Music with Affects," in *Emotion in HCI: Joint Proceedings of the 2005, 2006, and 2007 International Workshops (Stuttgart: Fraunhofer IRB Verlag, 2008)*.
10. A. Mehrabian, *Pleasure–Arousal–Dominance: A General Framework for Describing and Measuring Individual Differences in Temperament*," in *Current Psychology: Developmental, Learning, Personality, Social 14, no. 4 (Winter 1996)*.

EYE GAZE AS A VEHICLE FOR AESTHETIC INTERACTION: AFFECTIVE VISUALISATION FOR IMMERSIVE USER EXPERIENCE

Brigitta Zics

The paper explores the aesthetic potential of affective visualisation technology that responds to the affective changes of the user through reading their eye gaze. Through a critical investigation of current practices this research is exemplified with a practical application of affective visualisation that explores the interconnectivity of visualisations of swarm intelligence and dynamic affective changes of the user's immersive experience.

The Philosophy of Eye: The Eye-Mind Problem

Throughout the study of eye movement researchers have attempted to provide comprehensive models of how eye gaze can serve as a display of the mind, however, most research outcomes have failed to provide inclusive explanations. Early research has conveyed two significant but very different claims that have remained relevant, particularly in their accounts of the relationship between attention and eye movement. Both challenge an importance of the eye in processing information and give significance to the underlying voluntary processes of the mind as the control mechanism of attention or imagination.

Hermann von Helmholtz was one of the first scholars who attempted to explain how the mind is instrumental to the patterns of eye movements. He states that the eye's optical characteristics and information gathering is rather poor. Therefore, vision is only possible with some form of unconscious inference that makes sense of the information based on prior experiences of the world. [1] Studying the relationship between eye movements and visual attention, Von Helmholtz discovered the phenomena of 'covert attention,' which explained that visual attention is not always where eye 'fixation' (holding eye gaze on a single location) is directed to; he points out that one can attend to a stimuli without shifting visual focus. Observing letters on a screen that was too large to view at once; he noticed that without moving his eyes could 'covertly' attend any location of the screen. Although von Helmholtz's observation on visual attention introduces significant questions about the relationship between eye movements and cognitive processing, it can be stated that eye movements most commonly reflect a will to attend to objects in detail ('overt attention').

William James, reflecting on von Helmholtz account, provides an explanation of a very different aspect of visual experience in his discussion of the 'embodied eye'. James suggested that attention "is the taking possession of the mind, in clear and vivid form, of one out of what may seem several simultaneously possible objects or trains of thoughts…It implies withdrawal from some things in order to deal effectively with others." [2] He claims that attention and imagination are directly related; when attention does not regulate one's sense organs it is imagining things or actions that one is attending to, or looking for. James states that paying attention to what one is doing often consist of a similar kind of anticipatory imaginative engagement. As with Von Helmholtz's covert attention, James' 'imaginary' attention give prominence to the complexity of the eye-mind relationship, acknowledging that although the quality of motion and fixations might be measurable, their cause is not fully determinable.

The Physiology of the Dynamic Eye

In order to better understand the physiological capacities of the eye in reference to aesthetic experience, this section elaborates on the eye's basic functionalities and characteristics. It is well known that the size of the visual field is limited and can be divided into: 'fovea vision' (encompassing 2 degrees at the centre of the visual field) responsible for the sharp detailed sight, and 'parafoveal vision' (2-10 degrees off centre) responsible for low resolution compressed information next to the 'peripheral field' (>10 degrees off centre). Since the visual field cannot be processed from one single fixation (lasting between 180 and 275 ms), as a result of the limited acuity of the retina, rapid eye movements are necessary to bring the retinal image of an object of interest to lie on the fovea (saccades; lasting between 10ms and 100ms). Attention initially assigns a target before saccade eye movements happen. During saccades, vision is dormant and new information is acquired only during fixation.

For eye movement analysis there are three types of movements that might be modelled to understand the overt localisation of visual attention (when attention and eye location are matched). Fixation, 'smooth pursuits' and saccades are all under 'voluntary' control as such they are a result of intentional decision making (whilst 'involuntary' movements, such as micro-saccades, are unconscious). Whilst saccades are rapid jumps of the eye to shift gaze to the object of interest, fixations and smooth pursuits occur during the intermission between saccades. In smooth pursuits the eye tracks a moving object and compensates the velocity of the moving on the retina. Some of these voluntary eye movements can be practiced and improved with control, however a saccade cannot be disrupted. Involuntary eyelid movements, such as blinking of the eye, are recurrently applied for the measurement of affective states of the user.

Aesthetic Experience and Eye Movement Research: A Critical Revisit

Since eye movement research and its methods of recording often lends itself to reducing aesthetic experience to characteristics of behaviour, psychological accounts have subsequently been popular. An early example is Alfred L. Yarbus who used a 'scanpath' (a graph of saccades and fixations) and the visual recording of eye movements (fixations and saccades) to study complex scenes to identify mainly task-dependent patterns of fixations. Yarbus' well-known study of 'An Unexpected Visitor' proposes that the interpretation of a composition can be based merely on where the viewer looked on the image. [3] Similarly to Donald W Graham, who described the composition that guides the viewer's eye on a pleasing path of visual elements of the scene, he implies that compositions facilitate the artist's decision in the viewers' experience of looking. Yarbus explained the viewing process more as a task to be solved, and showed that the viewer reinvestigates elements of the painting that promise to explain the image. He acknowledged that: "these elements show that they give information allowing the meaning of the picture to be obtained. Eye-movements reflect the human thought processes." [3] Yarbus' approach neglected the multidimensionality of aesthetic quality of the image resulting in a limited account of aesthetic experience that only focused on the visual attention in the viewing experience.

An often-used concept in the study of eye movement research is Daniel Berlyne's description of 'diversive-specific' behavioural patterns of the viewer. [4] Berlyne's approach has been largely disregarded in contemporary psychology, yet topical eye movement research still applies his method. [5] According to these studies 'diverse exploratory behaviour' is when the viewer seeks out stimulation that has appealing collative properties (such as complexity, novelty, surprise and uncertainty that can trigger hedonic effects of arousal [4]) regardless the content or source; 'specific exploratory behaviour' is when viewer's

curiosity arouses through the uncertainty or lack of perception of particular information in the image. [5] The two types of accounts exhibit diverse patterns of eye fixations; the earlier shows diffuse clusters of fixations, the later contains high density of fixations. The initial use of Berlyne's work by Francois Molnar suggested that whilst knowledge based exploration is slow and purposeful therefore specific, pleasure based exploration is diverse. He furthermore proposed that good and bad composition can be shown by the number of transitions on the scanpath of the image before the exploration comes to equilibrium; he concluded that aesthetic engagement happens at early engagement and good composition needs fewer transitions.

Following these foundational studies, there have been many valuable contributions investigating aesthetic experience based upon discrete characteristics of viewing experience. For example, evaluating aesthetic appreciation between art-trained and untrained viewers, or understanding artist's perception in drawing or developing multidimensional methods inclusive of verbal recordings, task-directed recording and recordings of hand movements. [5] However, the major methodological problems of such research remained the same, which is the limited capacity of scanpath applications that are forced to evaluate dynamic experience of the viewer based on the analysis of static values. As a consequence, the application of reductionist conceptions of human experience has generated a fragmented account of aesthetics that broadly influenced the understanding of eye movements in aesthetic experiences and limited in its future applications.

Towards an Affective Eye: Eye Movement as Aesthetic Interaction

Mark Johnson declared that: "aesthetics must not be narrowly constructed as the study of art and so-called aesthetic experience. Instead, aesthetics becomes the study of everything that goes into human capacity to make and experience meaning." [6] Following the words of Johnson, this research also attempts to explain aesthetic experience (and aesthetic interaction) as the creation of meaning of an embodied mind. Applying Johnson's approach, human capacity in experience is explained here as affection when "meaning grows from our visceral connections to life and the bodily conditions of life… the bodily sources of meaning." [6] In a similar manner Brian Massumi referring to Deleuze and Guattari, describes affection as: "an ability to affect and be affected. It is a prepersonal intensity corresponding to the passage from one experiential state of the body to another and implying an augmentation or diminution in that body's capacity to act." [7] As such the aim of an aesthetic experience is to understand the meaning of one's everyday 'affections' in order facilitate effective engagement of the user with novel meaning creation. John Dewey explains this following: "to understand the meaning of artistic products, we have to forget them for a time, to return aside from them and have recourse to the ordinary forces and conditions of experience." [8] He goes on to state: "that experience becomes conscious, a matter of perception, only when meanings enter it that are derived from prior experiences." [8]

Following up on these arguments, in order to understand eye movements it is crucial to comprehend them as an enactive capacity that produces embodied meaning through its actions. The dynamicity of an eye, in this sense, is crucial for understanding aesthetic experience; any kind of attempt to represent this dynamic action can lead to a reduction in its characteristics. Therefore, in the framework of this research it is suggested that eye gaze in aesthetic interaction should be applied as a real-time property rather than a static value. As such, this investigation disregards the scanpath based methods of eye movement analysis and introduces 'aesthetic interaction' for aesthetic meaning creation.

Aesthetic interaction moves away from common conceptions of human-computer interfaces that focus on the 'invisibility' of the interface as most imperative facet of the human and computer relationship. Rather, aesthetic interaction requires a view where the system is a framework to facilitate user's expression and interpretation, promoting serendipity, provocation, surprise or how Umberto Eco referred to it, wonderment. In this sense aesthetic interaction acknowledges the ability of the user to appropriate technology and instead of immediate invisibility it offers an intellectual reflection process where the user's interpretations are instrumental to the system. As Graves Petersen et al. explains, aesthetic interaction "promotes improvising to be the key modality in how the user explores the worlds around her and learn new aspects." [9] Similar to the approach presented in this paper, they take Dewey's pragmatic approach further and explain bodily experience as a significant aspect of the interaction adding that: "we have to move beyond ideals of meeting human sensor motor skills and somatic sensing, to include among others human intellectual capacity to grasp and make sense of complex, contradictory and even ambiguous systems and situations." [9]

In summary, it is argued that real-time dynamic processes allow a meaningful exploitation of eye movement for particular aesthetic production. As a result, an open system is established where meaning is enacted through an indirect response mechanism where user's curiosity and imagination drives the interaction towards immersive states. The aim of such interaction is not to gain full control or full invisibility of the technology but to engage the viewer in a self-explanatory process of interaction through the movement of their eyes. As a result aesthetic interactive system is designed to respond to 'augmentations and diminutions' of the body [7] (in this case the eye) and produce responses to the anticipated affective state; meaning emerges through the continuous cognitive loop between the eye and the system.

Eye Gaze Driven Affective Visualisation and Swarm Behaviour

Having explored the aesthetic meaning of eye movement, this section introduces the concept of affective visualisation; a visual display that facilitates aesthetic experience through eye gaze. Data visualisation is generally described as "computer-supported, interactive, visual representations of abstract data used to amplify cognition." [10] An affective visualisation is an interactive system where real-time data of the users is collected and feed back to them after an evaluation of their affective state. The feedback mechanism is crucial to the interaction as the real-time flow of data is visualised to provoke an aesthetic experience for the user. In this sense the visualisation is not specifically aimed to represent data but reflect on the dynamic qualities of the data flow.

An affective modelling of the user in affective visualisation is an aesthetic exploitation of the feedback mechanism between technological effect and affective human response. Coupling the dynamic flow of visual elements (effect) with the eye movements as passage of experimental states of the body (affect) here will be explained as a 'cognitive feedback loop.' Such couplings entail an augmentation in the body's capacity to act which promotes user's involvement toward unexplored states of immersion. In application, a cognitive feedback loop is an open system where instead of discrete values for affective states the system allocates meaning to the changes in affective qualities of the user. This approach is similar to the so-called 'affective loop' concept introduced in HCI research as both concepts emphasise an affective input and output modality in order to facilitate unique and individual experiences of the user. However, cognitive feedback loop specifically builds upon the real-time dynamicity of interaction where aesthetic qualities do not represent affective states but trigger affection in real-time; this is a significant distinction as meaning here is linked to dynamic events rather than passive qualities.

An example application of the model described above is that developed for the 'Mind Cupola' biofeedback installation work. The main aesthetic concept of the display is to generate an open system that organises information along the user's eye movements in a way that it reflects their behaviour. The underlying mechanism of the visualisation is to guide the user towards a state of equilibrium, where the user's interaction is balanced between control and aesthetic satisfaction. There is no particular goal in the system other than to explore whether this process of interaction might activate imaginary capacities in the user experience by the engagement of meaning creation.

The affective modelling of the user is based on three characteristics: aesthetic engagement with the screen (level of engagement), task driven interaction (as level of attention, engagement, performance) and measurement of involuntary responses as eyelid movements (blink rate, blink closure duration). The system incorporates all voluntary eye movements such as saccades, smooth pursuit and fixations; involuntary eyelid measurements also captures user's affective responses over time.

The visual display consists of a particle system (collection of independent objects) that respond to the user's eye movement in a way that they represent three different intelligent behaviours according to the user's responses. This intelligent behaviour can be described as a form of 'swarm intelligence,' designed to visualise the natural phenomena of fish shoals, bird flocks and swarms of insects. The particular patterns (from ellipsoids to vortex arrangements) with emergent qualities such as speed, density and colour, are dynamically appointed to the changes in the user's evaluated affective states. For example fish shoal patterns is appointed to low engagement level, bird flocks to optimal performance and insect swarm behaviour to erratic engagement level. The particle system not only produces swarm behaviours but also forms simple messages as affective texts or recognisable shapes with affective meaning. They serve as a feedback mechanism for the participant, informing them of their performance over time enhancing their experience. As a result, aesthetic experiences are encouraged through the dynamic and affective quality of patterns and their responsive characteristic to eye movement.

A significant aspect of the aesthetic experience is the relationship between these emergent patterns and eye saccades. The swarm might follow or avoid the focus of the eye, which can be described as 'predator' or 'guider' behaviours. This is further used as a feedback mechanism for the user; in such a situation the system starts to distribute the swarm in such a way that it is shifted to the parafoveal vision and the peripheral field. This returns to Von Helmholtz's concept of covert attention, which implies that the user is asked to distribute or move their attention to the outside of their fovea vision. Task-driven aspects of interaction are when the user is asked to guide a swarm. Smooth pursuit eye movements are applied here to follow a particular path, or fixation when users are asked to focus to keep the swarm in a particular spot of the display to avoid, for example, objects with predator behaviour. In equilibrium the patterns become more harmonic with no predators, the aim is a pleasurable interaction based on the aesthetic engagement of movements.

The aim of this paper has been to discuss a non-reductive model of aesthetic experience that produces an affective engagement of the user based on information of the eye gaze. The semantics of this affective visualisation based voluntary movement of the eye whilst both, voluntary and involuntary responses, were evaluated in order to generate a cognitive feedback loop. It has been proposed that the collective behaviour of swarms might well simulate affective states or consciousness. As Johnson explained before, aesthetic qualities aim to trigger new meaning through the body; by the use of the relative quality of visual information and affective intelligence the users re-evaluates their everyday experiences of viewing and attaches new meanings to their actions. The critical evaluation of this research

hopes to stimulate further ways of applying theories of aesthetic experience and affective visualisation that aims to generate an open system for unique immersive experience.

An extended version of this paper with full references can be accessed at cognitiveloop.org.

References and Notes:

1. H. V. Helmholtz, *Treatise on Physiological Optics* (Rochester: Continuum, 1911).
2. W. James, *The Principles of Psychology* (New York: Henry Holt, 1890), 403-404.
3. A. L. Yarbus, *Eye Movements and Vision* (New York: Plenum, 1967), 190.
4. D. E. Berlyne, *Aesthetics and Psychobiology* (New York: Appleton-Century-Crofts, 1971).
5. C. F. Nodine, P. J. Locher, and E. A. Krupinski, "The Role of Formal Art Training on Perception and Aesthetic Judgment of Art Compositions," in *Leonardo* 26, no. 3 (1993): 219-227.
6. M. Johnson, *The Meaning of the Body: Aesthetics of Human Understanding* (University of Chicago, 2007), ix-x.
7. B. Massumi, "Notes on the Translation and Acknowledgements," in *A Thousand Plateaus*, G. Deleuze and F. Guattari (Minneapolis, MN: University of Minnesota Press, 1987), xvii.
8. J. Dewey, *Art as Experience* (New York: Minton-Balch, 1934), 2, 283.
9. M. G. Petersen, O. S. Iversen, Krogh, P. G. and M, Ludvigsen, "Aesthetic Interaction – A Pragmatist's Aeshetics Of Interactive Systems," in *Proceedings of 5th conference on Designing Interactive Systems (DIS 04)*, New York, (2004): 271.
10. S. Card, J. Mackinlay, B. Shneiderman, *Readings in Information Visualization: Using Vision to Think* (San Francisco, CA: Morgan Kaufmann Publishers, 1999), 7.

"IN THE REAR": ARTISTIC CONCEPT AND DIFFERENT SPATIALISATION METHODS

Lidia Zielinska & Rafal Zapala

The inside of the piano gets resized to the volume of a concert hall, with acoustic properties of the piano's interior being preserved and intensified. The composition deals with sounds generated inside the instrument, sounds of the instrument's mechanics, inaudible outside. In order to carry out the concept of sound space in full, a system of virtual devices had to be created. Their functions combine a number of spatialisation methods.
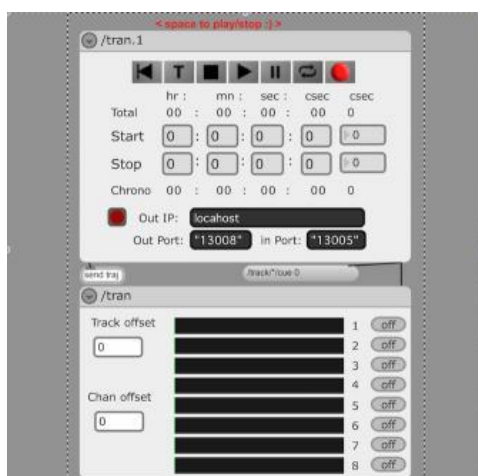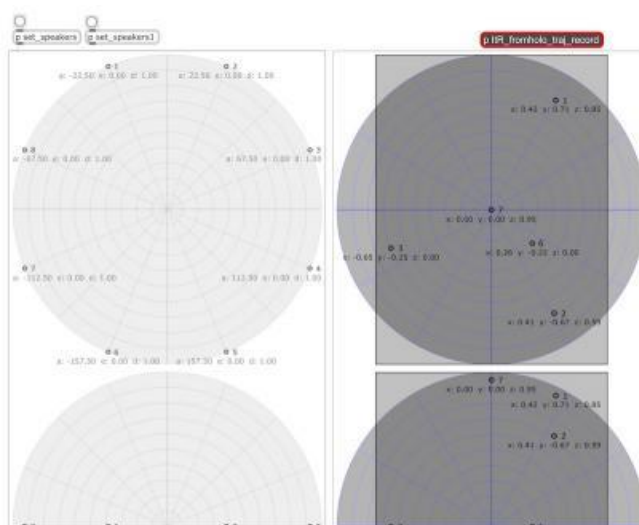

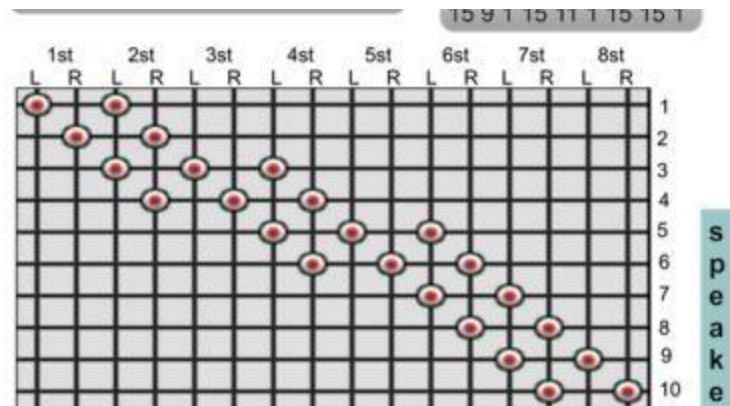Figure 1. Patch 1_bp_holoinput.

Figure 2. Patch 2_bp_ambisonics.

Figure 3. Patch 3_bp_player

1. INTRODUCTION

Composed simultaneously in ambisonic (live) and multichannel (fixed) versions, Lidia Zielińska's composition "In the Rear" (2010) is an acousmatic piece. The integrated system of different spatialisation methods was made by Rafal Zapała.

2. THE IDEOLOGY

In "In the Rear", piano keyboard becomes the interface between the inside of the instrument and accumulated experience of the listener's life. The acoustic world inside the piano looks different to what we experience at a concert: it resembles the experience of a child sitting under the piano. The acoustic world outside the instrument is not only its real sound at concert, i.e. in specific acoustic spaces of different reverberation, but also – or perhaps, above all – its sound in our long-term memory, in the tradition of piano literature, in various cultural codes and emotional reactions remembered.

The composition deals with sounds generated inside the instrument, at the back of the keyboard, so to speak: with sounds of the instrument's mechanics which are inaudible outside, as well as with specific reverberation inside the sound box. Symbolically, it also refers to what the instrument has experienced under numerous pianists' fingers. The inside of the piano gets resized to the volume of a large concert hall, with all acoustic properties of the piano's interior being maintained and intensified. Listeners experience resized timbres, as if they found themselves inside the instrument. Due to the scale shift, the aesthetic experience is accompanied by a more distinct physiological sensation (increased changes of acoustic pressure). One also hears idioms of great historical piano literature reverberate; this, in turn, is the support structure on which musical memory of each individual listener rests.

Motifs of 19th-century piano literature appear throughout the piece. The keys of these fragments have been adjusted; they employ a similar piano idiom. They have been edited as one sequence which preserves the musical logic and character of the erstwhile idiom even in the monophonic version. However, the motifs, which come flying to their meeting place from three spatial zones, establish a thoroughly different musical quality.

I also took the liberty of carrying out an experiment concerning our mental base. The piece originated in 2010, i.e. in F. Chopin's Year, and had its ambisonic première performance at the "Warsaw Autumn" International Festival of Contemporary Music. Listeners expected references to Chopin, and – even though there were none at the time – heard citations from Chopin's works, instead of Brahms', Rachmaninoff's and Gershwin's musical gestures quoted.

These were practical, both composing and performance/concert-related considerations that prompted simultaneous writing of two (multichannel and ambisonic) versions of "In the Rear".

In a home studio, one could control the results of a preliminary composition of the sound material solely in stereophonic and binaural way. It was only a trial at the 8-channel SMEAMuz studio that made it possible to compare the results with the imaginary spatial vision. A few days before the opening performance, a provisional system of 12 loudspeakers was assembled, which let us initially verify the ambisonic effectiveness of movement trajectories originally charted for sound objects in imagination.

From the technical point of view, performance of the multichannel (i.e. fixed) version, is relatively simple, and its acoustic adaptation is carried out by the composer or sound diffusion director as it develops. The ambisonic version, however, is performed by at least two persons: the sound director and the composer, or another competent person who computer-activates subsequent modules of the system and oversees their reliable operation. Furthermore, the ambisonic version requires an extra rehearsal to adapt the virtual system to the existing acoustic and technical conditions.

Unlike the ambisonic system, multichannel projection makes sounds move only along the circumference of the auditorium, and excludes their sufficiently precise travel along diagonals of the room. As it takes the dramatic edge off certain phases of the piece, duration of these fragments should be shortened. Thus, in terms of composition, it constitutes a different version of the piece with slightly modified contents and objectives.

At the composition stage, simultaneous development of both versions made one realise the consequences of particular solutions faster than usual. It also required permanent and full control over the whole of the sound material, as well as over its spatial distribution potential. It also led to quicker conclusions concerning perception of musical time in the all-important relation to the type of spatial distribution of the sound material. These experiences would be an ample source of material for a separate study; above all, however, they have already contributed to one's composing skills.

As far as the choice of technology is concerned, the most important assumption of the composition are three sonic layers related to their spatial disposition: a group of static stereophonic timbres, a group of monophonic sound objects dynamically exploring space, and a group of reverberation timbres.

The static group mixes different acoustic orders taken from the real world. A conventional multichannel system and 8 speakers would be sufficient for its projection.

The dynamic group – motifs "floating" in the space of the concert hall – required creating a special tool to precisely design movement trajectory, and to play it in the ambisonic system. The greater the number of speakers, the greater the precision of movement trajectories. With an arrangement of 48 speakers, the listener feels as if he or she were directly touched by sound objects floating in space.

The reverberation group required highest sampling frequency and employment of the ambisonic system to create an illusion of a concrete concert space significantly increased in size.

Each sonic group is the foundation for one phase of the composition. Thus, a need arose for each of them to build appropriate tools for concert projection.

For a composer witnessing a performance of her composition, these were observations of how different kinds of spatialisation affect the perception of time, the piece's dramatic quality, and listeners' comfort that were of great significance. Particularly important is the middle episode of the piece, in which spatial dimension and increased distance play a key role. Drastic reduction of the episode to a stereophonic version would require significantly shorter time proportions than the original ambisonic version. Similarly, an insufficient number of speakers would require recomposing the piece's time proportions. A small venue, causes considerable discomfort to listeners due to high acoustic pressure felt simultaneously from several different directions.

3. THE TECHNOLOGY

The multichannel version of "In the Rear" was intended for performance using the traditional multichannel system. Each audio track of DAW program has a fixed place in the surrounding space; it has a dedicated speaker. In order to satisfactorily present the complex spatial structure of the piece, 16 or more speakers (12 on the auditorium level, and 4 above) should be available.

It is the ambisonic technology that optimises execution of the composer's assumptions and visions related to spatial phenomena in the composition. In particular, this concerns organisation of object movement in space.

Ambisonics is a technology of work with the surrounding sound whose origins go back to the 1970s and the pioneering work of Michael Gerzon at the Mathematical Institute of Oxford University. It is particularly useful for a composer who finds the limitations of commercially available systems (5.1–10.2) unacceptable. These were the characteristic features of the ambisonic system that prompted the decision to use it in "In the Rear".

For the composer, the key requirement was full periphony, i.e. ability to freely compose in three dimensions. It concerns horizontal space, in which natural and flexible design of movement around the audience, as well as along diagonal axes of the system is possible. It also concerns unrestrained upward and downward movement of sound objects along the vertical axis. It was the efficiency of ambisonic technology that made fuller and more subtle design of one of the layers of the composition possible.

Ambisonics does not treat speakers as separate sources of sound. They are not borderlines between which the composer is forced to stretch his or her soundscape. Here, the idea is an opportunity to independently create a three-dimensional sound space developed virtually in the studio, or captured by means of relevant techniques of recording the surrounding sound. Such composition exists almost independently of the number and arrangement of speakers, as each time it can be adjusted to the size and type of the space, in which the piece is presented. It can be one of both regular, and unusual, experimental configurations. As I have already said, in Lidia Zielińska's composition the optimum arrangement is an axially symmetrical set of 16 speakers on two horizontal planes (12+4).

An additional advantage of the system which prompted the choice of this technology, is equivalent treatment of sounds coming from all directions – equivalent treatment of speakers, which only constitute a medium intended to carry a B-Format-coded composition in a manner closest to the natural. In traditional systems, particular speakers play highly specialised roles, which limits their functionality.

In line with the composer's assumptions, and – as a result – with the multi-layered structure of the piece, "In the Rear" combines different approaches to work with spatial sound.

The full spatial structure of the composition consists in the following layers:

- dynamic layer – monophonic objects moving in periphonic space,
- static layer – stereophonic sounds of defined location in the surrounding space,
- reverberation sound layer.

3.1. THE DYNAMIC LAYER

The dynamic layer is a set of monophonic sounds of precisely designed movement in space. Adequate precision and comfort of designing the trajectory was achieved with Holo-Edit software module, part of Holophon project systematically developed at GMEM Institute in Marseilles. [1]

Holo-Edit is a graphic editor of sound trajectory, which makes simultaneous animation of as many as eight tracks in three-dimensional space possible. It was selected for its high precision and method of operation known from DAW programs. The program automatically converts spatial trajectories drawn by the user into tonal changes of the moving sound, such as stratification of the spectrum, the Doppler effect, structure of reflection and reverberation, air absorption, etc.

It has to be noted that despite a similar working method, the program is not an audio sequencer. It is a tool intended only and exclusively for drawing and recreating trajectories. We do not process or edit sound; we only organize its movement in three-dimensional space. The program has no audio output to make hearing sound possible. There is no B-Format coding, either. To make it possible, data from Holo-Edit had to be sent to relevant tools created in Max/MSP.

3.1.1. Patch 1_bp_holoinput

Constructed for "In the Rear", the first patch (see Figure 1.) acquires data from the Holo-Edit program. Its main elements are two modules from Jamoma, an extensive set of tools created for the Max/MSP environment.[2] Open Sound Control data transmission technology is used at the crucial moment of communication between programs (Holo-Edit and Max).[3]

The first module of the patch is responsible for the so-called "transport" functions, i.e. transmission of data concerning time synchronisation, as well as for receiving key data about sound trajectory. The other module receives sounds, monophonic audio signals from the Holo-Edit. The dynamic layer of "In the Rear" consists in seven tracks.

3.1.2. Patch 2_bp_ambisonics

The task of the second patch (see Figure 2.) is ambisonic operation proper: coding to B-Format and decoding to multichannel form, which makes feeding sound to speakers possible. These functions are performed by a set of objects (ambiencode~, ambidecode~) written for the Max/MSP environment at the Institute for Computer Music and Sound Technology in Zurich.[4]

By coding a moving sound object to B-Format, we place it in a virtual, three-dimensional space. Two GUI type objects (ambimonitor) enable the user to monitor this space: control the objects' movement, and define location of speakers by means of which the piece shall be presented.

3.1.3. Patch 4_bp_output

Upon decoding, the signal is sent to 4_bp_output patch, which is responsible for audio interface outputs. This patch closes the audio network on the computer. Made up of typical elements of Max/MSP environment, as well as of objects which constitute the SPAT set developed at IRCAM in Paris, it enables the composer to add the final reverberation to correspond with the acoustics of the performance venue. [5]

3.2. THE STATIC LAYER

Stereo audio tracks transmitted in the periphonic space in a distinct way constitute the second layer of "In the Rear". Together with the designed movement inside its stereophonic space, each timbre has been assigned to a pair of speakers around the audience, and duplicated with speakers over the listeners' heads. This has created a static (though "live") space based on eight independent stereophonic systems expanded with sound coming from above.
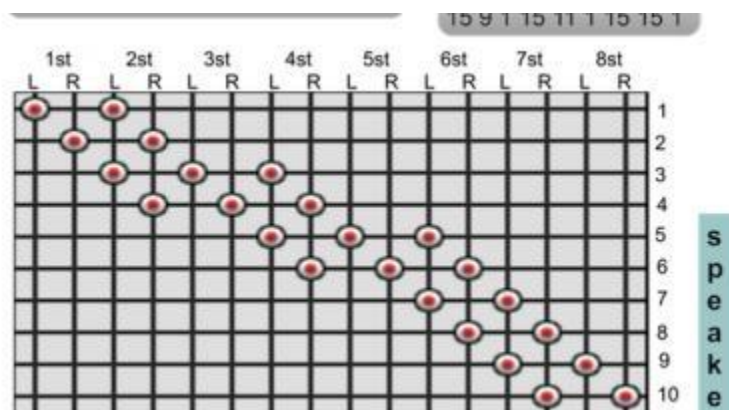

Fig. 3. Patch 3_bp_player

Patch 3_bp_player is responsible for playing these tracks. This patch works as a multichannel player of tracks created by the composer during her work at SMEAMuz studio in Poznan. Consisting in a set of multichannel players of stereo sounds, it is synchronised in time with Holo-Edit program and other elements of the system. To perform live in different spaces, the composer had to be able to freely assign particular tracks to specific pairs of speakers. This function has been incorporated into the patch in the form of matrix (see Figure 3.)

3.3. THE REVERBERATION LAYER

The material used to produce this layer mainly originated in a recording of real timbres inside the piano. It was also here that ambisonic technology was used, although it was employed in a different way.

Using the tools built to meet the requirements of the composition's dynamic layer, the composer was able to create virtual space in the studio, practically speaking, from scratch. The goal of the reverberation layer, in turn, was to render the acoustic reality of the inside of the piano, and to expand it to the size of the concert hall. Thus, a technology of recording the material directly in the 4-channel structure of the B-Format was employed. SoundField ST350 microphone was used. An extensive collection of piano timbres was built: whole phrases, individual timbres, sounds of the instrument's mechanics, as well as specific reverberations inside the body. The character of the recorded timbres is both static and dynamic: they move in space. In her work, the composer used Lexicon 960LD to select and transform the material, as well as to elaborate its reverberation.

Sounds of this group are played by the other multichannel player in patch 3_bp_player. Similarly to static sounds, it boasts the ability to configure speakers through the matrix.

Sounds from all sources, effects of all spatialisation methods, "meet" in the previously discussed patch 4_bp_output. Objects employed on it enable its quick adaptation to specific performance conditions: the number of sound card outputs (which is related to the number of speakers used), and acoustics of the hall (through the ability to finally correct the reverberation of the entire piece).

References and Notes:

1. *Holophon Project Web Site, http://www.gmem.org/index.php?option=com_content& view=article&id=346&Itemid=232 (accessed November 1, 2010).*
2. *Jamoma Platform Official Web Site, http://jamoma.org (accessed November 1, 2010).*
3. *Open Sound Control Protocol Home Page, http://archive.cnmat.berkeley.edu/OpenSoundControl (accessed November 1, 2010).*
4. *Institute for Computer Music and Sound Technology Web Site, http://www.icst.net/research/ projects/ambisonics-tools (accessed November 1, 2010).*
5. *IRCAM Spatialisatour Web Site, http://forumnet.ircam.fr/692.html?L=1 (accessed November 1, 2010).*

COLLABORATION MODELS IN BIG SOUTH LAB

Andreas Zingerle, Tyler Freeman, Lars Kynde & Anne Nigten

This paper highlights the co-creation processes of two electronic art and design works in the Big South Lab; the VJacket coordinated by Andreas Zingerle and Tyler Freeman and The Big South Orchestra, coordinated by Lars Kynde and Maartje van den Hurk in collaboration with 12 youngsters. We'll examine the design models and the co-relation between the deployed collaboration models and the projects' qualitative outcomes or co-ownership.
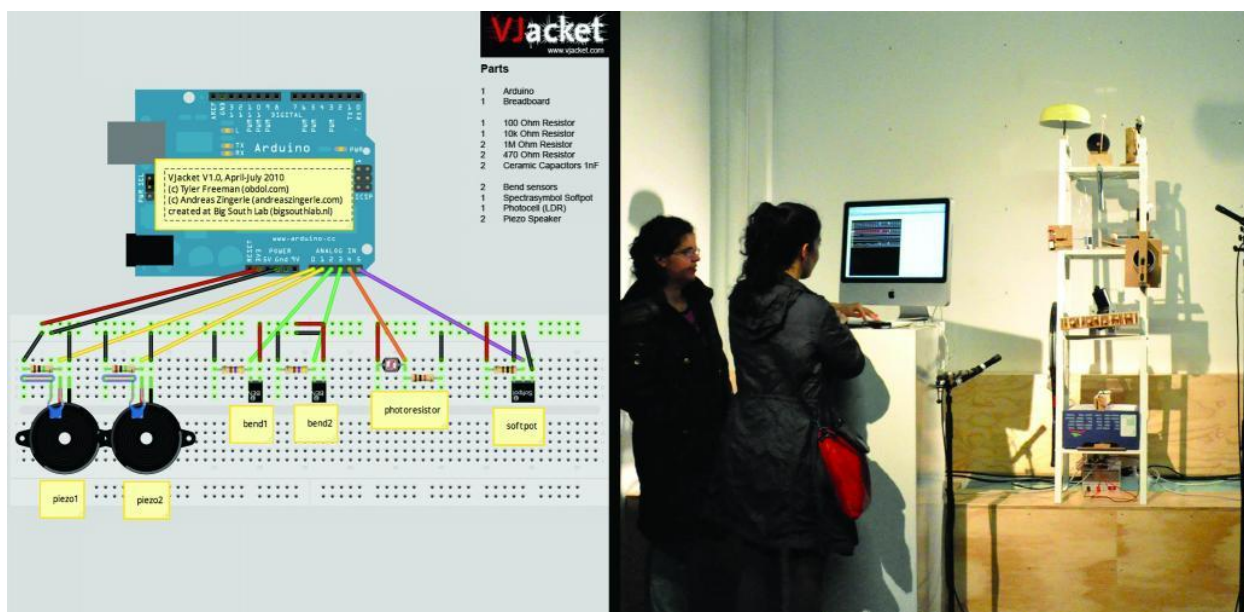
Design document VJacket (L),presentation Big South Orchestra (R). CC some rights reserved The Patching Zone (Zingerle, Tyler, Kynde, Nigten).

The context: Big South Lab

Big South Lab was the second project that The Patching Zone realized in Rotterdam South, in the borough of Feijenoord. The Patching Zone developed the Big South Lab project for young people between the ages of 15 and 27. The Big South Lab is modeled around training, through workshops and co-creation projects, in the creative media field. Big South Lab, executed and initiated by The Patching Zone and its partners, distinguishes itself from competitors and other initiatives through its way of working: above-average students and young professionals addressed a socially relevant project as a team. The team combines some principles of participatory design, co-creation and interactive art. This means that stakeholders (young people/residents) play an important role in the design, realisation and distribution process. Their roles vary from designers, usability testers, interns, scouts, trend watchers, co-owners of projects. **[Nigten]** Negotiation and collaboration are central in The Patching Zone approach; in this paper we'll investigate the consequences of the chosen collaboration models in Big South Lab.

Freeman and Zingerle report about the design process of the VJacket

The VJacket is a piece of wearable technology that enables the wearer to interact wirelessly with audio-visual processing software. Implemented in the jacket is a sensor network consisting of bend, touch and hit sensors that you can trigger and control your preferred audiovisual effects in realtime, all from the comfort of your own jacket [VJacket] The jacket invites you to move your body to trigger these effects, show your rhythmic expression or just dance to your favourite music and create visuals at the same time.

 Our objective was to create, with the VJacket, an alternative way to access and manipulate audiovisual content. Inspired by research projects like "the Djammer" [slyaden],"Go Dance" by [negrillo] or the "sensorsuit" that was used by the Dutch performer 'Eboman' [eboman] we wanted to free the DJ/VJ from the 'behind the screen' posture you can normally find them at parties or in nightclubs. This objective was combined with the interest of the project's focus group. In general a lot of teenagers try to express themselves through fashion, dance and music and want to show this at social events and parties. The designers' initial concept, originating from media art, was suggested to be interesting for the focus group as a starting point, while details for the design were developed with the two representatives of the focus group.

 Following the objectives, we split the development process of the VJacket in different design phases, each covering a specific field within the making process. This resulted in modular workshops where we gave introductions into 'Vjing and software', "Wearable technology', 'Arduino and sensors', 'Alternative controllers used in VJ performances' and 'Making of the jacket' [bsl]. Tyler Freeman [odbol] and Andreas Zingerle [az] both work in the media art field and realized various projects as VJs, interface designers, musicians or experimental film directors. Teaming up at the Big South Lab [bsl] we did several workshops for teenagers and young adults in the Rotterdam-Zuid area, examining a creative (mis)use of technology. The two bsl interns Geoffrey Frimpong and Kevin Brito were our scouts into the subculture of the neighbourhood. Considering several design choices like comfort, style, sensor placement and content creation we were planning, designing and prototyping, in several 'peer2peer sessions', a second version of the VJacket with them.

 A more detailed overview on the design challenges and technicalities can be read in our paper "Enabling the VJ as Performer with Rhythmic Wearable Interfaces" [az, tf].

THE VJACKET DESIGN CYCLE

The VJacket was developed in an iterative way, we describe the major steps of the design and development process that we took. The design cycle was based on a pragmatic approach that showed a parallel with the combined approach for user centered and user driven design Eric Reiss gives. **[Reiss]** 'Firstly, we organized a series of user centered workshops based on the information we received from our scouts, we prepared a series of workshops that generated feedback on the design decisions and informed the next steps for the design process. For example; we hosted the 'Vjing and software' workshop. The students were very fast learners and by the end of the two hour workshop they had already created a VJ set to play for a hip-hop concert that they were performing the next day. Now it was time to show them how to use alternative controllers and OSC to affect the visuals. We started with the WiiJ Video program, an application that allows you to VJ using gestures and motion tracking using the Nintendo Wii remote. [http://wiijvideo.com] This workshop was held at the Go-for-IT! Relaunch Festival, and there

were even young kids trying the controller who excelled at controlling the visuals with little or no training.

In one of the final workshops, we worked with the students to develop their own VJacket, here we shifted from a user centered approach towards a user driven and finally for the last parts towards a participatory approach within the given boundaries of the VJacket design framework. The VJacket hardware was designed in a modular way, with the ability to choose exactly which kinds of sensors you wanted to use. The circuits and software were designed as to allow any combination of sensors, which can be swapped with other sensors by attaching them with velcro. The variable sensor position allows for comfortable attachment and finer sensor control customized to the wearer [gemperle, 4].

This modular design was tailored, according to principles from participatory design, for particular users such as for step dancer Geoffrey Frimpong. This version allowed us to use all percussive piezo sensors, so he could slap different parts of his jacket during the dance for a dominantly rhythmic, staccato audiovisual performance. In contrast, the other custom made version for Kevin Brito, reflect his dance style and is more smooth and flowing, so he made a lot of use of the bend sensors and slide sensors during dancing. In this way, each sensor in a person's VJacket is an extension of that person's style: just as an expensive suit is tailored to follow the contours and movements of an individual's body, the VJacket's sensors are placed to capture and accentuate the performer's natural style, creating a highly personalized instrument.

VJACKET'S STATE OF AFFAIRS

The VJacket was presented to the public in several smaller events and presentations and also shown in a big event that took place in November 2010 at the Creative Factory [cf] in Rotterdam. The development process was documented and resulted in 'Do-It-Yourself' explanations that can be found on popular community sites [make] [instructables], and the source code for the Arduino2OSC software is available for download and collaboration on the VJacket website [VJacket]. The VJacket is a work-in-progress by the designers Freeman and Zingerle.

Kynde reports on the design process of the Broad Band Band, Big South Orchestra

The following part of this paper is an analyzes of the co-design and development process of the interactive musical installation, the Broad Band Band [BBB], that was presented at the Big South Event, on the 19th of November 2010. The installation consisted of a variety of small mechanical instruments activated by motors and solenoids, controlled from multiple computers via a network based graphical interface.

BIG SOUTH ORCHESTRA: FIRST PHASE OF THE DESIGN CYCLE

During the first phase we, the designers, Lars Kynde [LK] and Maartje van den Hurk, created the overall concept, the framework and interface of the installation.

In contrast to the two later design phases, we (the designers) took part as participants. We were working creatively within the overall structure of The Patching Zone.

The Big South Lab priorities to be incorporated were: "Elements of music, interactivity and technology, implemented via the Processpatching-approach [PP] (meaning transdisciplinary collaboration as found in electronic art) and The Patching Zone-approach (meaning participatory design, bottom-up approach, and involvement of the stakeholders)"

BIG SOUTH ORCHESTRA: THE SECOND PHASE OF THE DESIGN CYCLE

The self-playing mechanical instruments used in the installation were created during a workshop with 12 participants (18-26 years old). The workshop participants were invited to create an electro mechanic musical instrument each. To do this they were provided motors, solenoids, materials for building and sound production and the necessary tools. The participants were free to experiment and build on the basis of their individual ideas. On the other hand they were restricted to use the material available, and though we had tried to find as big a variety of components as possible with the emphasis on letting the materials be as non-specific as possible, it was impossible not to influence the creative process through these pre-choices. The participants were encouraged to work independently on each their instrument, so that everyone would go through all the steps of the creative process. On the other hand they were also allowed to help each other and to interchange ideas. We, the workshop leaders, changed gradually our behavior during the day of the workshop, allowing gradually bigger freedom and independency to the participants. We, the designers, started as masters and by the end of the workshop days we worked as peers with the participants. Even though the changes happened gradually, I could sum it up to three different roles that we took during the workshop-day: Initially, we started as initiators (masters) presenting the idea and giving the assignment. We moved from the previous 'user centered' working model towards 'user driven' model as we passed the authority on to the participants and with that came also our trust in their self-responsibility of finding the right solution. Still we walked around the table to overview the process and assisted them when this was needed.
Thirdly we put ourselves completely on the same level as the participants, sitting around the same table building our selves more instruments, and at the same time sporadically giving advises to the projects in process. Since they were also increasingly helping each other, the distance between workshop leader and participant became smaller towards the end of the workshop. The results became a broad variety of instruments all with very distinct personalities reflecting the different personalities of their creators.

BIG SOUTH ORCHESTRA: THIRD PHASE OF THE DESIGN CYCLE

The installation let the public take the role as composers. The interface functioned as an empty musical score rolling over the screen from right to left. The score was ready for notes to be drawn by the visitor. During the presentation two computers were connected and synchronized via a local network. That made it possible for two composers (visitors) to work together on the same musical score simultaneously.

BIG SOUTH ORCHESTRA: FEEDBACK FROM THE FOCUS GROUP

During the day of presentation, the interest of the visitors was mostly centered on the creative interaction. They were trying to find the most cool rhythm or building up an ideal sequence of sounds to be executed, enjoying the compositions as they took shape.
At the same time, the visitors did not express any need for saving or recording their compositions, or otherwise keeping or using the results after the creation, even though they put a lot of time into building up the compositions and exploring the interface and the instruments, they did express great joy interacting with the instruments and each other, creating a piece of collaborative music.

Concluding thoughts on both projects

The VJacket's development cycle showed how much the makers and the focus group share interests in Interaction Design, photography, music, street culture etc. Sharing these interests made it a fun time to plan the VJacket, work on different workshop proposals and create special content for it. It needs mentioning that the cycle of engagement for the content workshops was much shorter than the required engagement time span for the development of the entire VJacket project. The short concentrated workshop cycles were focused on direct outcomes, after several afternoons the participants finished their own movie, in some hours they made a rap, mixed sound or participated in a VJ session. Workshops with direct results and short cycles that focused on topics or media expressions that were somehow familiar to the focus group worked well and also generated relevant material. The quality of the workshop's outcomes varied a lot from aesthetically convincing to more well done and amateurish.

Working over a longer term with the youth from the neighborhood on the VJacket turned out to be problematic due to the lack of many continuity aspects that made it impossible to create a presence with the VJacket team within the neighborhood society or creatively-influence the youngsters' minds. The creators Freeman and Zingerle created the first prototype within 2 months in a user-driven way. After the lack of qualitative input from the focus group the designers decided to develop the second prototype more according to a user centered design. Although the two focus group collaborators kept on being interested to work together they did not seem to feel any ownership and it was difficult to plan a performance with the jacket and to motivate the interns to create their own film clips to VJ with.

Compared to the initial objective of the VJacket, the user-centered design process was a good attempt to start from, whereas the user-driven process was more problematic. The quality of the project's outcome therefore can only be measured according to the makers' design and media art standards and we feel that we did not succeed in creating co-ownership. The cycle that is suggested by Eric Reiss that includes the option to jump between user centered and user driven could not be established. The VJacket is still a work in progress but seems to meet the designers desired artistic qualities.

Kynde states on the results of the Big South Orchestra:

'If I personally should say what I took with me from the Big South Orchestra project, then I would put the emphasis on the experience the project gave me. I would mention the knowledge and skills gained from my own research and the help from my colleagues and the experts, and I would certainly mention the experience gained by leading the workshop.' Kynde continues: 'the final outcome of the process, was of course part of the process itself, and those two can therefore be difficult to separate. Yet I would state that the value of the final work, meaning the physical outcome, seems infinitely small compared with the value of the experience. I agree thus with the general reactions that I got from the other frameworks during this project, namely that the process was experienced as more valuable than the final result'. […] 'The success criterion for the Big South Orchestra was mainly mutual inspiration and learning during the creative process, secondarily the artistic quality of the installation produced.' We therefore can state the process was successful, if we take the enthusiasm of the participants as our main indicator. Although, the participants did enjoy the making process, they did not engage with the final results.'

OVERALL CONCLUSION

As an overall conclusion one can state that we can determine a co-relation between qualitative outcomes and the co-creation process in the Big South Band project. In this project the quality of the collaboration among the youngsters and the designers can be considered as being of high quality, if we take the participants enthusiasm and their presence as a reference. For the presentation of the Big South Orchestra, the makers mention the interaction as another qualitative parameter though here a new audience came in. One therefore can state that high quality input and engagement in the workshops did, in this case, not generate a need for workshop participants to showcase the work. A similar pattern can be observed with the short workshops in the VJacket design cycle. The content workshops (short time span) were well attended and generated qualitative outcome. The longer term collaboration was more difficult to establish in the VJacket development process, here the designers decided to leave the planned user driven approach and to continue according to a user centered approach. The quality of the VJacket's final outcome will therefore be measured from a designer's viewpoint only.

References and Notes:

[az] http://www.andreaszingerle.com/

[aztf] T. Freeman, A. Zingerle, Enabling the VJ as Performer with Rhythmic Wearable Interfaces ISEA2011 Turkey

[BSL] Big South Lab http://www.bigsouthlab.nl/?q=node/43

[eboman] http://wwwebomaninfo.wordpress.com/

[Eric Reiss] www.youtube.com/watch?v=7lDyChSlrQY

[CF] http://www.creativefactory.nl/

[gemperle] F. Gemperle, et al. "Design for Wearability", Proceedings of 2nd ISWC IEEE Computer Society Press, 1998

[instructables] http://www.instructables.com/

[LK] www.larskynde.dk

[BBB] http://www.youtube.com/watch?v=GaRn9Adnags

[make] http://www.makezine.org/

[negrillo] B. Negrillo Wrist Brace VJ http://www.mindness.net/ivrea/onthebody/index.html#video

[Nigten] A. Nigten, editor, Real Projects for Real People, Vol.1., NAi-V2_ 2010, ISBN 9789056627973

[nugroho] J. Nugroho, et al. Understanding and Evaluating User Centered Design in Wearable Expressions, Proceedings NIME 2010, Australia

[odbol] http://www.odbol.com/

[slyaden] A. Slayden, ea The DJammer: Air-Scratching and Freeing the DJ to Join the Party, Proceedings CHI 2005, United Sates

[PP] http://processpatching.net/ [pz] http://www.Patching Zone.net

[VJacket] http://www.VJacket.com/

 [wiij video] http://www.wiijvideo.com/viideo.php

NEUROBODYGAME: THE DESIGN OF A WEARABLE COMPUTER FOR PLAYING GAMES THROUGH BRAIN SIGNALS

Rachel Zuanon & Geraldo Lima

This paper has as a main objective to present the design aspects involved in the development of the NeuroBodyGame that consists of a wearable computer that allows the user to play games using their brain signs. It is a wireless interface for brain interaction with games loaded into the system. Both games and wearable computer react to the emotion of the user at the moment of interaction.

Fig1 NeuroBodyGame – Neuro Action, 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa

Fig2.*NeuroBodyGame – Interaction with Game by brain wave activity and neurophysical signs from user. 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa*

Fig. 3. *NeuroBodyGame – BCI interface, 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa*

The advances achieved in recent years through ubiquitous computing, "as the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user," [1] are responsible for transforming significantly how men and machines interact. This way, the body presence of the interactor, distended by its gestures, is sufficient to establish the communication flows between these systems, until then only mediated by the physicality of tangible interfaces.

Mouses, keyboards and joysticks make room for the user's body, free to move about in the digital space miming his actions in the three-dimensional physical environment. Loose or limited movements, gestures and voices construct the expression of the visible body, in a continuous dialogue mediated by the invisibility of intangible interfaces. The configured mobility thus announces another condition for interactive existence in which games stand out as universe of hybrid reality – physical and digital.

This context gains even more dimensions with the addition of concepts from affective computing, in which the machines presenting affective abilities focused in recognition, expression, modeling, communication and in response to user's emotion [2] and bio-interfaces, by providing a differentiated condition

for interaction, governed by the user's biology. [3] In other words, the interactor's emotion literally comes into play so an interactivity of another nature can present itself.

Within this scope, NeuroBodyGame is a wearable computer that incorporates the concepts of wearable affective computing and of the bio-interfaces (functional biometric interfaces and the brain-computer interface) to provide an organic interaction between humans and games and thus lead these systems to a co-evolutionary relationship in which the games and the wearable computer are changing according to the thoughts and emotions of the users at the moment of interaction. Thus, this paper has as a main objective to present and to discuss the principal design aspects involved in the development of this wearable computer focused on allowing the users to play games using their own organism.

Art, Science, Technology, Fashion and Games: a transdisciplinary design

Initially, it is important to underscore that the creation and development of the entire NeuroBodyGame (NBG) system involves a transdisciplinary team comprised of artists, designers, doctors and engineers, which provides the encounter and unique exchange of knowledge between specific areas of training that present themselves fully articulated and integrated to the product's final result.

NBG integrates wireless interfaces for brain and biometric interactions with games loaded into the system, which allows the users to play games using their neurological and physiological signals. Thus, the functional biometric interfaces are responsible for checking the player's ANS (autonomous nervous system) variability and for providing information about his physical status or behavior, gathering the physiological data in a continuous manner, that is, without having to interrupt user activity, in this case, his playability with the game. In this system, two biosensors are used as input channels for the interactor's physiological data: the galvanic skin response sensor (GSR); and the blood volume pulse sensor (BVPS). The brain-computer interface employed transforms the electrophysiological signals of reflexes from the player's central nervous system activity into messages to be sent to the game being played. In other words, in NBG, the player's physiological information acts as data to configure an interaction that corresponds to his organism's status, specifically at that given moment of his relationship with the game in question.

In order to achieve all ages, two games that are being used with the NBG: NeuroBodyGame Dragon which aims at a light user and has a less complex playability and NeuroBodyGame Car which aims at a more experienced user and presents a complex playability. Both games are open source – a fundamental characteristic for providing full remodeling of the programming and integration with the games' controls and the interactor's brain and physiological commands.

Like the frequencies of the brain waves, acquired from the brain-computer interface, the player's following physiological parameters are also read during playability, by the functional biometric interfaces: emotional variability; anxiety control; emotional response; sympathetic and parasympathetic nervous system; functional oxygen; and cardiac frequency. The mapping of these brain waves and these parameters are done and associated in real time to game features, which begin to react in accordance with the player's physiological state. In other words, the feedback obtained by the interactor from the game as well as from the wearable computer results from his emotional state during the interaction with the entire digital system.

Thus, the playability can get easier or more difficult according to the brain wave frequency and the physiological state of the user at that very moment. The wearable computer interprets the brain activity and the emotional state of the user and reacts to it by changing the colors (back and front) and by applying vibrations (back). A really calm user, extremely careful and focused will have his playability enhanced and the NBG will mostly react by showing the color blue. If the user is just calm and focused, the color displayed is green. A tense user, if a bit unfocused or even nervous, will have his playability worsen and the NBG will react to it by turning into yellow and applying a soft vibration in the area of the back. And a really tense and unfocused user will have his playability worsen and the NBG will react by changing its color to red and by vibrating really intensively.

In relation to the piece of clothing that carries the wearable computer, the starting point for its investigation and creation follows the same principles that govern the conception of pieces for a fashion collection, in which for defining its formal elements, the following aspects must be considered through experimental research: fabrics, textures, silhouette, finishing, processing, color, comfort and adaptation of these to the design for each piece. In this sense, the project procedure for the NBG proves to be identical. However, differently from a piece for a collection, in NBG, the project does not focus all its efforts in external appearance of the clothing, but rather in the structuring of its interior. In other words, it focuses on the incorporation of a series of necessary devices for operation of the wearable computer, which requires specific and appropriate adjustments for their implementation and consequently for obtaining satisfactory results.

The objectives desired by NBG, as previously described, require it to have a series of cables and electrical wires; LED tapes, rechargeable batteries, vibrators/massagers; keyboard; sensors and electrodes, for acquiring vital signals; as well as a controller system for all information acquired and interpreted in real time, which enables user-computer interaction. For such, as a first step, the guiding concept for distribution of all items in the NBG lies in considering that its internal structure reproduces the interior of the human body, taking the brain as the main point from where the nerve stimuli responsible for body functioning depart and arrive. That is why, the electrodes and sensors responsible for measuring the user's neural and physiological signals are located in the front view of the wearable computer.

Thus, with the human body as a reference, along the spine and medulla, the NBG reproduces the chain of electrical conductors which allow sending information to other areas of the wearable device. In a second instance, the distribution of other devices and circuits is carried out, allowing the operation of all wearable computer items. In the third step, support points are created for each of the internal components while the final design of the piece of clothing is established. The fourth step, in turn, focuses on the choice of fabrics, which have basic divisions and classificatory subdivisions that refer to the types of each in the set. There are two main divisions: texture – which influences the look of the cloth, the cut and the modeling – and the framework, which establishes the foundation on which the yarns are supported and indicate the sequence the loom will work, providing them with different aspects and uses. [4]

In order to build the NBG, different textile structures can be considered for receiving all the components mentioned above. At the same time, the user's comfort must be taken into account during the entire process for installing this wearable computer since poor adjustment of the piece to the player's body can hamper playability. Furthermore, NBG's design aims at uniting comfort, sensations and emotions of the user, also related to the tactile experience with the wearable item, because "although touch is not exactly an emotion, its sensory elements induce neuronal, glandular, muscular and mental alterations that together we call emotion." [5]

Thus, the design of the wearable item considers the application of three raw materials that, together with modeling, unite the intrinsic aspects of its making, comfort and esthetics. Thus, the first fabric, besides defining the inside of the piece of clothing, also constitutes the structure on which all circuits and devices are supported. Also, considering the need to carry out their maintenance, a second fabric is used to accommodate and provide stability to the applied components, preventing them from slipping during use of the NBG. And the last fabric, while granting the appearance of the wearable computer, also provides for the light emitted by the LEDs installed inside to be revealed without exhibiting the devices and circuits that comprise the interior of the piece.

For the process of choosing the raw materials, which meets the needs of the wearable computer, it is necessary to observe that the weight, fitting, elasticity, movement, adherence and texture are qualities of the fabrics as are the color, print, weave, structure, shine, opacity or transparency, flexibility and malleability. [6] Thus, these textile characteristics or qualities, which also deal with the behavior of fabrics in relation to touch, guide the definition of materials and respective colors used while also adding quality and providing the desired results for the operation of NBG, such as: (1) allow transparency and noninterference in the projection of colored light hues emitted inside the clothing; (2) in its external appearance, translate visual comfort and shine as key needs; (3) the notions used in making the clothing must also be in chromatic harmony. From these definitions, the design of clothing considers the use of materials in their compositions that alternate the use of yarns and fibers like cotton, polyamide, polyester and synthetic foam - the latter responsible for the piece's structural base.

Associated with that, a concept of significant importance and which also permeates the making of the piece as a whole is found in the possibility of it being used by bodies of diverse biotypes. For such, the shape of NBG was defined based on a vest, since it permits adjustments to different bodies by extending or reducing the piece using adapters and Velcro applied to the internal face. It means that the wearable computer can be expanded or contracted in order to fit the user's body. Its main challenge lies in the fact that it tries to preserve the user's comfort. Once each and every possibility of discomfort may alter the neurophysiologic signs and by doing so, it would compromise the organic information acquired. The same criteria was used in the composition of the strap that is attached to the head – for acquiring the player's brain signals – and also considered for designing the wrist, where the keyboard used for the game is installed.

Another important moment to emphasize, considering its impact on the design of the wearable computer, guiding the making of needed adjustments, involves the usability tests conducted with NBG users throughout the entire process. These tests include the analysis of aspects related to comfort, mobility, and adaptability of the user to the functional biometric and brain-computer interfaces and the integration of physiological functions of the player's organism to the functionalities of the game in question.

Also, the player/NBG relations observed during interaction of a significant number of users – more than 5,000 – during exhibit of the wearable computer at FILE (International Festival of Electronic Art) 2010, leads to the conclusion that the use of biological information from the interactor to configure organic playability with the games constitutes a fertile field of research, considering the immersion potential the brain-computer and functional biometric interfaces provide when associated with affective computing concepts and applied to interactive digital systems, such as computer games.

Game Training and Neuro Action Stations

NeuroBodyGame's design also extends to physical space, taking into account greater immersion of users with the proposed games. Conceived as two different environments, also called Game Training and Neuro Action stations, respectively, its interactive space configures an installation.

In a first moment, and still without use of the wearable computer, the interactor learns about the two games. This occurs in the first station, Game Training, which consists of a space dedicated to necessary training for the user to become familiar with the games indicated before interacting with the wearable computer. This training occurs directly on a desktop computer.

Neuro Action, in turn, consists specifically of user interaction with the games through their brain and physiological signals, based on use of the wearable computer. In this instance, the games are designed on an 80-inch screen that integrates game visualization to neural activities and other physiological parameters of the player that are being acquired by NeuroBodyGame during playability. The projection is made at a comfortable height for game visualization by people of different heights, meeting the ergonomic parameters and also keeping a minimum distance between the screen and the interactor.

Thus, from all these aspects presented and discussed above, in our future studies we consider the design of wearable computers that provide increasingly complex levels of interaction between the user's organism and the elements that constitute a game - characters, scenarios, feedback and playability - in order to configure effectively co-evolutionary communication between both systems: biological and technological.

References and Notes:

1. *Mark Weiser, "Some Computer Science Issues in Ubiquitous Computing," Communications of the ACM 36, no. 7 (1993): 75-84.*
2. *Rosalind Picard, Affective Computing (Cambridge, MA: MIT Press, 1997).*
3. *Rachel Zuanon, "Bio-Interfaces: Designing Wearable Devices to Organic Interactions," in Biologically-Inspired Computing for the Arts: Scientific Data through Graphics, ed. Anna Ursyn (Pennsylvania: IGI Global, 2012).*
4. *Gilda Chataignier, Fio a Fio: Tecidos, Moda e Linguagem (São Paulo: Estação das Letras, 2006), 43.*
5. *Ashley Montagu, Tocar: O Significado Humano da Pele (São Paulo: Summus, 1988), 131.*
6. *Andrea Saltzman, El cuerpo Diseñado (Buenos Aires: Paidós, 2004).*