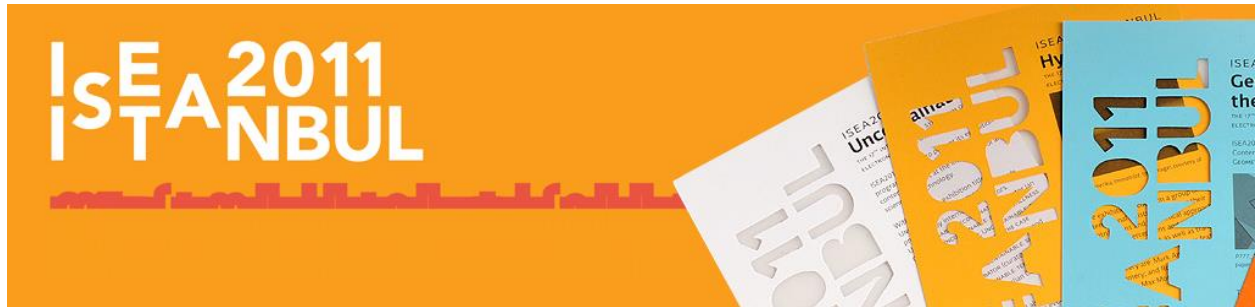




ISEA2011 ISTANBUL
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1732	Performative Encounters In Media Art: An Unsitely Aesthetics	Maria Miranda
1738	Playground Gaming With Wii, Kinect And Processing	Grethe Mitchell & Andrew Clarke
1744	New Aesthetic Energy Infrastructure And The Land Art Generator Initiative	Elizabeth Monoian & Robert Ferry
1751	From Archive To Retroscope And Beyond: Pushing Forward Resource Development	Catherine Moriarty
1756	Theorizing New Media In A Global Context	Soraya Murray
1762	Huggable Nature Workshop	Hye Yeon Nam
1767	An Amorphous Image Process	Kevin Sarmiento Navarro
1771	Digital Technology, Social Media And Emerging Trends In Film Production Methodologies	Jodi Nelson
1778	Aesthetics Of Voice	Norie Neumark
1785	Sketches Of An Interdisciplinary Practice	Kim Newall & Charles Walker
1792	The Hidden Histories Of Objects: Provenance, Storytelling And Tagging Technologies	Simone O'Callaghan & Chris Speed
1798	Network Media: Exploring The Sociotechnical Relations Between Mobile Networks And Media Publics	Rachel O'Dwyer
1804	Partially Buried University	Karen O'Rourke
1810	Ludic Listening: Sound Art In Video Game Design	Aaron Oldenburg
1813	Bodies, Interactivity And Technicity In Media Art	Andreia Oliveira
1819	Nanovibrancy: An Auditory Performance Of Nanoscale Resonance	Joel Ong
1826	Touch Interfaces: Between Hyperrealism And Invisibility	David Oswald
1831	The Light At The End Of The Tunnel: An Interactive Installation In Public Space	Selin Ozcelik
1834	The Rhetoric of the JPEG	Daniel Palmer
1840	Examining Issues of Body Image and Complex Regional Pain Syndrome within the Digital	Mark Palmer
1848	On Breathing And Geography: Sonifying The Severn As Shared Generative Art Practice	Michaela Palmer
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1860	Mobility Into Immobility: Designing Networks	Luisa Paraguai
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1872	Transcending Into The Virtual: Presence Prognostications And The Re-Calibration Of Telematic Art	Ellen Pearlman

1878	BodyCAD: Creative Architectural Design Through Digital Re-Embodiment	Banu Pekol
1884	Subtle Presence: Design and Implementation of User Centric Content Delivery Using Biometric Data Capture and Intelligent Analysis	William Pensyl
1890	Art ↔ Science Relationalities	Olivier Perriquet & Bill Seaman
1896	You Hold the Camera Now: An Action Research Case Study of Pre-kindergarten Transmedia Narrative Design	Gabriel Peters-Lazaro
1899	Pursuing The Unknowable Through Transformative Spaces	Maja Petrić
1906	Big Bird is Watching You!: Art, Activism and Technology in the Public Arena	Denitsa Petrova
1912	Mass Body Index: Bio-OS, a Biological Operating System	Mike Phillips, Birgitte Aga, Gianni Corino & Simon Lock
1919	The Choreographic Horizons Of Isabel Rocamora: 'Incalculable' Exiles	Annalisa Piccirillo
1925	The Estonian Experience: Non-Institutional Media Art Production In Estonia	Piibe Piirma
1928	The Rhetorical Art Of Data Visualisation	Jeremy Pilcher
1934	Digital And Interactive Choreography: Innovative Women In The Dance History	Ludmila Pimentel
1938	The Food Side Of Sound Aesthetics	Leandro Pisano
1944	Visualizing New Media Art In Central Eastern Europe	Agnieszka Pokrywka
1949	Digital Art And Culture After Industry? Towards Aesthetic Business Studies	Søren Pold & Christian Ulrik Andersen
1955	The Big Bang Of Electronic Art: Merging Abstraction And Representation In The Age Of Digital Imaging	Anat Pollack
1958	Opera and the Cult of the DJ	Justine Poplin
1964	New Media Contemporary Information Paradigms: The Reordered Memory On FILE Archive Structures	Gabriela Previdello Orth
1968	Cityscapes: Exploring The Spirit Of Urban Identity	Francesco Proto & Richard Vickers
1972	Beyond Paradigmatic Shift: Mapping Culture And Society Of Digital Age	Mikhail Pushkin
1978	Data Trash	Melinda Rackham
1981	Terra Virtualis: They Are Reality	Melinda Rackham
1984	Tracing The City: Exploring The Private Experience Of Public Art Through Art And Anthropology	Martha Radice, Kim Morgan & Solomon Nagler
1990	Digital Anthropophagy And The Anthropophagic Re-Manifesto For The Digital Age	Vanessa Ramos-Velasquez
1998	A Potential Landscape	Jonas Ranft
2004	Visualising Emotions And Autism	Barbara Rauch
2011	Stichtures: Interactive Art Installation For Social Interventions	Claudia Rebola, Patricio Vela, Chauncey Saurus, Tayo Ogunmakin & Jorge Palacio
2016	Flying Robotic Arts For HRI And Interface Research	Nicolas Reeves & David St-Onge
2023	The Genealogy Of A Creative Community: Why Is Afternoon The 'Granddaddy' Of Hypertext Fiction?	Jill Walker Rettberg
2030	Are You Really T/Here? Affect, Affordance And Vitality In Heterotopii Of Flows	Kate Richards
2036	Herding Cats To Infinity	Peter Richardson
2042	Machine Music Through The Ears Of The Repairman	Morten Riis
2048	Techno-Cultural Asymmetry In Latin America	Claudio Rivera-Seguel
2054	Gestus	Hector Rodriguez

2059	The Work Of Art And The Internet. New Curatorial Issues: NETinSPACE, A Case Study	Elena Giulia Rossi
2065	Laborers of Love/LOL: Behind the Scenes	Stephanie Rothenberg & Jeff Crouse
2070	Aesthetic 3D Rendering Of Historic Shipwrecks: An Artist's Intervention In Maritime Archaeology	Chris Rowland
2077	Digital Paint To Digital Photography: The Long Reach Of Abstract Expressionism	Cynthia-Beth Rubin
2081	Feedback As Self-Performance	Steve Rushton
2087	Insecure Territories: Interventions In City Interfaces	Georg Russegger
2090	The City As Ludic Interface: Vectors Of Vireal Testlabs In Urban Mediatecture	Georg Russegger
2094	Virtual Doppelgänger: Embodiment, Morphogenesis, And Transversal Action (Panel Introduction)	Susan Elizabeth Ryan
2097	Crying With The Virtual	Semi Ryu & Stefano Faralli
2104	Suzumushi: A Silent Future	Gavin Sade
2109	Stop-Motion Animation: Towards A Realistic 3D Camera Movement Control	Laura Saini, Nicolas Lissarrague, Gudrun Albrecht, Lucia Romani
2115	GUTAI Movement in Japan and Art Afterwards. Towards New Understanding of Current Media Art	Rie Saito
2119	Moments of Liminal Space: Methodologies and Practices for the Study of Transition	Melissanthi Saliba
2125	Fashionable Wearables in Digital Performance	Marios Samdanis, Yikyung Kim & Soo Hee Lee
2132	Social Media As Art And Vs Art	Manthos Santorineos & Stavroula Zoi
2137	Cosmopolitanism And Narration: The Digital Tale	Viola Sarnelli
2143	Future Master Craftsmanship: Where We Want Electronic Textile Crafts To Go	Mika Satomi & Hannah Perner-Wilson
2150	The Magnetic Field Of Audiovisual Art Practices	Nermin Saybasili
2156	The Interactive And Immersive Experiences Shape The New Architectural Language	Teresita Scalco
2159	Is Augmented Reality The Ultimate Museum App? Some Strategic Considerations	Margriet Schavemaker & Hein Wils
2165	Error In Apparatus As Aesthetic Value	Alejandro Schianchi
2169	Powering Ecological Futures	Lea Schick & Anne Sophie Witzke
2177	Conceptual Relations: Musical Representations Do Not Need Music Theory	Sebastian Schmidt, Thomas Alexander Troge. & Denis Lorrain
2184	Responsive Illuminated Architecture	Christian Schneider. & Stefan Müller Arisona
2188	War And Art In The Screenic Era	Adam Schrag
2194	Interactive Technotextiles: The Hybrid Between Textiles And Technology	Bettina Schülke
2200	Design Of An Interactive Cultural Heritage Experience: The Historical Orchestra	Ferhat Şen & Reha Dişcioğlu
2206	ART<>SCIENCE: An Ontology	Timothy J. Senior & Florian Wiencek
2209	I, Robot: Rethinking Jack Burnham's Systems Esthetics	Margaret Seymour
2215	Improving The Information Society Through Awareness Of Languages	Alan N. Shapiro
2220	North, Interrupted	Leslie Sharpe
2226	Art And Play In Interactive Projections: Three Cases	Geoffrey Shea, Michael Longford & Elaine Biddiss

2232	Visualising Invisible Networks As Collaborative Arts Practice	Pip Shea
2238	Object Geography: The Internet Of Things	Duncan Shingleton
2244	Choreographing Topological Spaces Within Dance Performance With Real-Time Video	Kate Sicchio
2251	Walkingtools Concepts: Rethinking Locative Media	Cicero Silva & Brett Stalbaum
2256	Geo Sound Helmets: Breath-Controlled Installation	Cara-Ann Simpson, James Laird, Ben Landau & Eva Cheng
2262	Betaville: The View From New Brooklyn	Carl Skelton
2268	Data Disinformation: Data Manipulation And Iagemaking	Helen Sloan
2271	Cleaning And Character In Motion Capture Portraits	Susan Sloan
2274	Haul Out: Goodbyes	Tegan Smith
2280	Creating Black Boxes: Emergence In Interactive Art	Joan Soler-Adillon
2287	SOFT CLOUDING: Curating a New Semantics for Sound Archiving.	Morten Søndergaard, Thomas Markussen, Barnabas Wetton & Ivan Dehn
2293	Camera, Canvas, and Computation: New Frameworks for Representation and Abstraction	Anne Morgan Spalter
2296	Responsive Spaces: Motion, Activity and Interactive Art	Ryan Spicer, Andreea Danielescu, Aisling Kelliher & David Tinapple
2300	Syncretic Social Agency: Deterritorialised Robotics and Mixed Reality Data Transfer Systems	Julian Staddon
2305	Stitching Together an Editorial Sewing Circle	Åsa Ståhl, Kristina Lindstrom, Johanna Rosenqvist & Melin Margareta
2312	New Media and Exhibition Making: Some Forecasts	Jasmin Stephens
2315	@juspar and Now Quoting Galloway: "Code is the only language that is executable". Does What It Says. #code #chun #netpol1010	Igor Stromajer
2318	Cyvers city	Susana Sulic
2326	Neuro-Technology and Augmented Perception	Amanda Tasse
2329	Superdutch: New Media, Photography and the Internet-Polder	Jordan Tate
2332	Colour Data Processing	Jordan Tate, Adam Tindale & Ryna Boatright
2335	Urban Ecologies: Designing for Dystopia	Joni Taylor
2339	Intelligent Content and Semantics Algorithms: the next digital artists?	Luis Teixeira
2343	Reconsidering Media Art Dynamics	Nell Tenhaaf
2350	Future Guides for Cities	Michelle Teran
2356	Between Past And Future: Collaborating In The City Space	Mikkel Thelle
2359	Playing With The City	Ioulani Theona & Dimitris Charitos
2362	Mapping By Ourselves: Towards A Media History Of Geomobility	Tristan Thielmann
2369	Towards A New Symbiosis In The Mexican Environment: Art & Science	Reynaldo Thompson & Juan Angel Mejia
2376	[i-metro] Universal Access To Information	Therese Tierney
2382	The Nature of (in)Perfection	Kevin Todd
2389	Capturing Gestures For Expressive Sound Control	Todor Todoroff, Cécile Picard-Limpens, Julien Leroy & Alain Crevoisier
2396	Towards Geospatial Cultural Planning: Strategies For Local Cultural Innovation With Locative New Media Art	Tanya Toft
2402	The Unforgiving Ratio	Darren Tofts

2407	Computers As Metaphor, Minds As Computers; Notes Towards A Dysfunctional Robotics	John Tonkin
2411	Here To There And In Between: Commuting Through Perception	Jack Toolin
2417	The Memory And The Code: The Phantasm Of Digital Culture	Javier Toscano
2422	Skedimata: Guinea Pig And Performer	Patrick Tresset, Frederic Fol Leymarie & Nanda Khaorapapong
2428	From Immaterial To Hypermateral	Colette Tron
2434	Transforming The Physicality Of Emotion	Joan Truckenbrod
2439	Intersections Of Interdisciplinarity: Technological, Transnational And Feminist Formations In The Public Electronic Art Of Muriel Magenta	Tanfer Emin Tunc
2445	Embedded Sound: A Project On Turkish Traditional Calligraphy And Its Multi-Touch Transformation	Adviye Ayça Ünlüer, Oguzhan Ozcan & Hüseyin Kusu
2452	Urban Cracks: Interstitial Spaces In The City	Elly Van Eeghem, Riet Steel, Griet Verschelden & Carlos Dekeyrel
2459	From Literal To Metaphorical Utopias: Space And Time In The White Cube	Christina Vatsella
2465	Two Steps Back And One Step Forward: Remediation As Innovation Factor In The Case Of Machinima	Thomas Veigl
2472	The Making Of Diamandini: Perception, Identification, Emotional Activation During Human-Robot Interaction	Mari Velonaki
2475	Digital Materiality – Making the Ungraspable (<i>Unbegreifliche</i>) Perceptible	Eva Verhoeven
2478	LIFE-LOG-ART	Lenara Verle
2481	Imagining The Social Change: New Media In Czech Art Discourse In The 1990s	Jindra Veselska
2484	Morphogenesis	Christophe Viau
2490	Many With A Mobile Cameraphone: The Democratization Of Documentary?	Richard Vickers
2497	Self-Trackers: Why Do They Prefer The Spreadsheet To The Sofa?	Stephanie Vidal
2504	Capturing Dance And Choreotopography: Analyzing And Visualizing Complexity	Kim Vincs
2509	Fashion Hacking As Shapeshifting	Otto von Busch
2515	Evolving Spaces Along Network Technologies	Sandrine von Klot, Ebru Kurbak, Isabella Hinterleitner & Mathias Mitteregger
2521	Theoretical Discourse On 'Art, Science And Technology Collaboration' And Its Historical Development	Lioudmila Voropai
2527	Beyond The Conflict Of The Faculties: A New Institutional Case Study Of The Founding Of A Radical Transdisciplinary Art/Science/Technology Program	Charles Walker
2530	Painting Further Along The River	James Faure Walker
2532	Design For Life	Meredith Walsh
2539	Integrating Weebly And Go Daddy.Com In A Streaming Media And Audio Production Portfolio Course	Daniel Walzer
2543	A Layered Process: Lyrical Improvisation	Beth Warshafsky
2546	Classical Hollywood As An Epistemological Network	Birk Weiberg
2552	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

2558	The Im/possibility of Time Regained: Navigating the Unstable Past, Present and Future of Internet Art	Annette Weintraub
2565	W0rdM4g1x. Or How to Put a Spell on Media Art Archives.	Nina Wenhart
2571	(He)artbreaking to the Core. Zombie Data and the Arts of Re/De/Transcoding	Nina Wenhart
2577	Liminoid Acts	Emma Westecott
2583	Local Colour and Networked Specificity	Mitchell Whitelaw
2587	The (Re)Mediation of Experience: A Case Study	Florian Wiencek & Stephanie Sarah Lauke
2590	The Aesthetics Of Private Footage And Youtube Within Avantgarde Video Art	Paul Wiersbinski
2593	Flying, Spinning, And Breaking Apart: Live Video Processing And The Altered Self	Todd Winkler
2600	Motion In Place Platform: Virtual (Re)Presentations Of Iron Age Movement	Kirk Woolford & Stuart Dunn
2607	Sky Knowledge: The Square Kilometre Array (SKA) As A Focus For Art-Science Collaborations	Suzette Worden
2613	Place In Mind: Towards A Dynamic Memory Palace	Adrianne Wortzel & Damon Loren Baker
2617	Playing In Place Nowhere: Creating An Open Source Country	Andrew Y. Ames & Alexia Mellor
2623	Benji: A Brief History Of The Man Who Brought The Intelligence Of Search To Our DNA	Amy Suo Wu
2626	Basic Interaction Design Education: Creative Solutions in Visualising Actions	Asim Evren Yantac & Oguzhan Ozcan
2631	Augmented Movement Vision: Moving, Seeing and Sensing	Tyng Shiuh Yap
2637	Just Type: A Multichannel Platform For Experimental Typefaces	Jesvin Puayhwa Yeo
2643	Electronic Music And Two Composers From Turkey	Seyit Yore
2649	Solar Artworks	Nacho Zamora
2655	Remix Cultures And The Imagining Of Alternative Intellectual Property Policies	Martin Zeilinger
2661	Users Become Re-Creators: Enhancing Experiences Through Mapping	Anja Zeising & Dennis Krannich
2666	Eye Gaze As A Vehicle For Aesthetic Interaction: Affective Visualisation For Immersive User Experience	Brigitta Zics
2672	'In The Rear': Artistic Concept And Different Spatialisation Methods	Lidia Zielinska & Rafal Zapala
2679	Collaboration Models In Big South Lab	Andreas Zingerle, M.A., Tyler Freeman, Lars Kynde & Anne Nigten
2686	Neurobodygame: The Design Of A Wearable Computer For Playing Games Through Brain Signals	Rachel Zuanon & Geraldo Lima

THE ELECTRONIC REPRESENTATION OF INFORMATION: NEW RELATIONSHIPS BETWEEN THE VIRTUAL ARCHIVE AND ITS (POSSIBLE) REFERENT

Gabriela Galati



Screenshot: <http://www.googleartproject.com/museums/met>

The present work focuses on the new relationship generated by electronic information between the virtual archive (the Web in a broad sense, certain specialized archives in particular) and its referent (material reality in general, museums, inter-art practices, and artworks in particular).

What Nam June Paik conceived as a shift from the telecommunications network to a “multilevel digital communication network” is now taking place at a highly accelerated pace with vast unexpected consequences and possibilities for the artistic field. Moreover, it has also a close relationship to what Manuel Castells [1] defined as the “space of flows” or “real virtuality”.

“The space of flows” is the abstraction of time and space and their dynamic interactions within digital age society. Castells developed this idea to “re-conceptualize new forms of spatial arrangements under the new technological paradigm”; a new type of space that allows distant synchronous, real-time interaction.

“The space of flows” can be experienced right now, a “multilevel electronic communication network” in which anyone can access from home not just of a website, but also the 3D photographic representation of a certain place, the street view of her/his house, of a friend’s house, of a possible place to rent, or of a museum. This access is also making the distance between remote places seem inexistent in a certain way.

This concept opens several questions, for example: how is this representation presented? How is this possibility of accessing a physically distant place in all its details, without actually being physically there, affecting the ways in which this space is perceived?

In this regard, the electronic elaboration of the representation of information suggests following new paths, not only to deal with massive amounts of data, but also to better penetrate the domain of knowledge that every person should possess [2].

Moreover, the forms this representation of information takes are closely related to the ways in which its perception is structured and shaped. As Manovich [3] puts it "by organizing computer data in different ways, the interface provides different visions of the world". Therefore, the relationship between information, its representation and the referent (or in other words, the relation between reality and the conceptual construction of reality) has to be re-thought.

As many theorists advanced, this representation does not need to be-in-the-place-of a 'physically existent' entity, and that is why the referent is only 'possible'. Postman (1985) defines *virtual* as being so in practice though not strictly or in name; and *real* as actually existing, and advances that

"We don't see reality as it is but as our languages are. Our languages are our media. Our media are metaphors. Our metaphors create the content of our culture." "There is no separation between "reality" and symbolic representation. In a way, all reality is virtually perceived." [4]

Virtual or real, this digitalization is changing the status of the digitalized works, at the same time that influences our perception of them. In the same way language and metaphors build our 'reality' or structure our perception of the world, the Net as a text influences our perception of material reality, and the ambiguous nature of language has to be taken into account in this respect.

Thus reality, as experienced, has always been virtual because it is always perceived through symbols that frame practice with some meaning that escapes their strict semantic definition.

"A system that generates real virtuality is a system where reality itself (people's material/symbolic existence) is entirely captured, fully immersed in a virtual image setting [...] in which appearances are not just on the screen through which experience is communicated, but they become the experience." [5]

In this sense, a virtual presence is not less real than a material one, so where does the difference reside?

Following Levi-Strauss' [6] statement that the inadequacy between the signifier and the signified is the cause of every mythic and aesthetic invention that were aimed to cover this flaw, or this unfitness; it is possible to think about the inadequacy between the virtual archive and its (possible) referent in these terms. It is necessary to try to understand what is happening with this non-fit, or overspill, and accordingly, what is happening in the gap, in the "inadequacy" between the virtual archive and the physical museum. This overspill can be considered the intrinsic ambiguity of symbolic production. Moreover, the very well known impossibility to 'translate' symbolic productions is what generates the change of the ontological status of digitized work.

In his article "The Archive Without Museums," Hal Foster [7] advances the hypothesis that photographic reproduction allowed a new "dialectics of seeing," represented by the positions of Walter Benjamin: namely, that photographic reproduction strips art of context and aura, and therefore its cult value and exhibition value are lost forever. In contrast, André Malraux claimed that the museum guarantees art as such, and photographic reproduction offers the means to put together "the bits and pieces" into the meta-tradition of "style".

If the museum guarantees the status of art and photographic reproduction permits stylistic affinities, what might a digital reordering encourage?

It is possible then that electronic information and digitalization establish new dialectics in which a museum's legitimating function is replaced by the virtual archive and/or museum/gallery websites.

It could be also said that some artworks are being produced solely to exist for the virtual archive? Moreover, has the time come when on-line documentation of exhibitions that never happened are created and presented?

At the same time, as Bolter and Grusin [8] advanced about the process of *remediation*, the influence goes both directions: from the virtual to the material, in the ways artworks are documented, affecting the processes of legitimization and probably also of production; and from the material to the virtual, when the virtual is anchored to reality in the imitation, or realistic representation of it (specially three-dimensional space).

Without falling into *modernists* positions about 'the intrinsic' possibilities of each medium, could we find a way in which the new archive can deal with art without imitating physical reality in the display? By taking the most profit of the hyperlink logic, and thus of the "overspill" and of ambiguity, can we create a non-linear, more experimental and open archive in which each user could ideally build her/his own path through it? It has been discussed if this 'freedom' of choice provided by the hyperlink logic and the virtual database is only an illusion or an utopist idealization of the medium. Even if not unlimited, this possibility exists and the medium undoubtedly offers a considerable degree of "personalization" in the paths to follow through a certain database or archive.

The shift Foster talks about is from the perception of the world as an image, to the codification of the world, and these images included, that result into pure information.

"[...] the humanism of the world-become-picture may reverse into the inhumanism of the world-become-information. For in the virtuality of the archive [...] what is real is not what appears at any moment, but what is conserved in memory [...]" [9]

In the same way the object is digitized in the archive, the medium loses its original materiality to be converted into a pure image. By being absorbed and re-generated in the virtual database, its status changes to the one of an "image-text", or of an "info-pixel".

This is the reason why the virtual archive no longer needs a physical referent. It doesn't mean that it has been removed from all physical support, only that the support of the information (memory and database), which constitutes the object's new "materiality", does not coincide with the support that presents it to be seen and apprehended (a screen). Therefore, even if the referential relation is not completely annulated, it becomes weaker and fragmental [10]. The iconic sign, in Peirce's terms, still maintains its relationship of resemblance with the object, but the medium has been converted into an image-text, and info-pixel [11]; its materiality has been 'translated' into information, into a code.

This new database is generating a dematerialization of memory and its record. However, this dematerialization is not the same proposed by the Conceptual Art of the '60, this is a somehow 'new' dematerialization, which does not imply an annihilation of the object, but just a change in its ontological status.

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PARTICIPATING IN PARTICIPATION: POLITICS AND CITIZEN POWER

SEETA PEÑA GANGADHARAN

This paper applies a seminal critique of participatory politics written in the 1960s in relation to modern day experiences of citizen participation. Arnstein's writing on "participating in participation" unmasks the superficiality of online participatory projects and practices.

Participating in participation: Politics and citizen power

In the United States, the past decade has been marked by an optimistic discourse about the technologies of political participation in American government. But what power have these tools created? Drawing from earlier criticisms of participatory democracy, this paper provides evidence that citizens are doing little more than participating in participation. Until innovative participatory designs happen alongside commensurate changes among political powerholders, online participation will represent more of democracy's failures than its achievement.

A new wave of optimism

In 2009, the Obama Administration arrived to Washington, D.C., amid a wave of optimism about tools for online participation. Throughout the 2008 election, the Obama campaign developed MyBarackObama.com, a social networking platform designed to engage interested voters and provide them with tools for enlisting volunteers and generating support (Kreiss 2010). In the months before taking office, President Obama and his transition team launched a *Citizen Briefing Book*, a website that invited ordinary citizens to register their hopes and proposals for the Obama Administration and rank individual entries. Shortly after taking office, President Obama declared: "My Administration is committed to creating an unprecedented level of openness in Government." [1]

Illusory involvement

The zeal with which the Obama Administration has embraced online participation is an invitation to reflect on when and whether participatory designs equate with citizen empowerment. As early as the 1960s, observers questioned the gap between participation and influence, suggesting that citizens and communities would remain disempowered if powerholders simply celebrated participation as having happened. Among the most persuasive of these was Sherry Arnstein, a health policy expert involved in community development projects around the country.

In 1969, Arnstein synthesized her experiences into a short critical essay. *A Ladder of Citizen Participation* looks at the palliative effects of participatory projects. According to Arnstein, a significant problem with designs for participation is that they are more concerned with offering participation than taking citizens' concerns seriously. She described that most citizens are invited into policy debates for their appearances rather than for their ideas or to move along debate and influence outcomes. Participants in these scenarios are manipulated by "powerholders... [who] 'educate' or 'cure' the participants" (Arnstein 2003, p. 246) of their problems. As a result, "What citizens achieve in all this activity is that they have 'participated in participation.' And what powerholders achieve is the evidence that they have gone through the required motion of involving 'those people'" (247).

By contrast, Arnstein said that the most laudable form of participation occurs when “have-not citizens obtain the majority of decision-making seats, or full managerial power” (Arnstein, 2003, 247). In other words, successful participation is measured by the extent to which outcomes reflect the concerns, arguments, or proposals of citizens. Arnstein's critique focuses on the substance of citizen participation and the ability for citizen input to move public policy. From her vantage, citizens require a direct means of transforming political outcomes. Failure has scarred “every other means of trying to end the powerlessness” (Arnstein 2003/1969, 246).

When viewed in relation to the routines and demands of American society, Arnstein's push for direct democracy is far from pragmatic. As Young (2006, 2000) argued, the complexity of modern society deters the kind of decision making that Arnstein envisioned. The type of direct democracy implied by Arnstein's critique entails coordination and cooperation of a degree that large, diverse countries like the United States would find nearly impossible. Modern democratic societies demand a system of political representation so that citizen *ideas* and *arguments* have power within political discourse and influence political outcomes. Nevertheless, modifying Arnstein's call for direct democracy does not diminish the persuasiveness of her main argument: participation which is staged for performance, for ticking off a box that indicates participation has happened, does nothing to change structures of power in the political landscape.

Participation's promises and failures

The problem of “participating in participation” unmask the superficiality of much of the promise of on-line participation in electronic government. One example of the illusory participation are the “reboot” efforts of the Federal Communications Commission (FCC). The FCC is the premier regulator of media, communication, and information in the U.S. It creates policies related to the management, ownership, and operation of wireless and wireline communication systems.

When Chairman Julius Genachowski was appointed to the head of the FCC, he pledged to fight for consumers and transform the agency into an “21st century agency for the information age” (Genachowski 2009, 3). He focused participatory reforms on creating new online tools to welcome citizens to the virtual front door of the agency. Soon after his appointment, the agency set upon a path to reform of the electronic means for public participation. From live-streamed, captioned video of its public meetings to a redesigned entire website, to staffers' blogs about their work to a YouTube channel and Facebook page, the FCC broadened its online presence. The agency also created mobile apps that users could install in order to test home broadband speeds began tweeting announcements of its most controversial policy proceedings. Improving public access was paramount in agency that had “communications” in its middle name, according FCC managing director Steven VanRoekel (Howard 2010).

The comprehensiveness with which the FCC has gone about implementation of new forms of online participation is impressive on paper. Within two years, the agency has cultivated a set of digital tools to push and receive information to ordinary individuals and communities. It drew accolades from technology-focused blogs and news services, like *O'Reilly's Radar* and *Ars Technica*. On its own blog, the agency boasted of its innovative efforts, stating that the FCC was “[p]utting citizen skin in the game to make FCC.gov work better for users, and holding us accountable to continual improvement.” [2]

Apart from accolades, however, the FCC's record on serving citizens and consumers reflects very little of its talk about empowerment of the non-expert, lay participant in communication policymaking. The

most controversial decisions that have come before the agency since 2009, when Chairman Genachowski came to power, are an ode to conventional, “inside-the-Beltway” policymaking than transformation of FCC culture. The FCC's *Open Internet Order* (2010) concerned the extent to which telecommunications carriers can discriminate in how it manages data traffic over the internet. The decision handed down by the agency excused mobile carriers from anti-discrimination measures, paving the way for price changes in mobile internet access.

The proceeding saw more than 100,000 commenters, many of whom included citizens and their representatives, such as media reform groups, public interest organizations, and community associations. As Arnstein would have predicted, these commenters were recognized not for the arguments they registered with the agency but for the fact of having happened. The final report and order made little attempt to extricate the complexity of the opinions and arguments raised by ordinary opinions. Neither did it seek to answer explicitly to a discourse of concern over industry-friendly internet regulation.

An announcement by Meredith Atwell Baker, one of the commissioners who had voted for lenient internet rules, suggests that participatory reform was a weak proxy for citizen power. Four months, Baker left the FCC to become the chief government relations person for NBC-Comcast, a major supporter of lenient data traffic management rules. Before it had merged with NBC, Comcast led a legal battle to weaken the FCC's ability to institute anti-discrimination rules for internet providers. Baker's move evidences the extent to which government and corporate powers mutually support one. The nexus between state and market deters the ideas of ordinary people and their hopes for how democratic society ought to be governed from having a fair chance of being heard and influencing political outcomes.

We participate, they profit

In the original 1969 publication, Arnstein accompanied her critique with an image of a poster taken from the 1968 student uprisings in Paris. Translated into English, the poster read, “I participate, you participate, he participates, they participate, we participate... they profit.” In an era where digital tools for participation abound, government and corporate powers are still profiting from the citizens' involvement in decision making. It legitimates their activities, shows that participation has happened as a matter of procedure, and masks the need to engage with the proposals or demands contained within citizen expressions. Until state and market actors transform how they interact with one another and either intentionally or unintentionally collude to minimize the power of citizen voices, American politics will fail to live up to basic democratic ideals.

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‘WOODEN WORLDS’ - AESTHETICAL AND TECHNICAL ASPECTS OF A MULTIMEDIA PERFORMANCE USING REAL-TIME INTERACTION

Javier Alejandro Garavaglia & Claudia Robles Angel

Wooden Worlds is an audiovisual, interactive performance by Claudia Robles Angel and Javier A. Garavaglia. The piece, of variable length, is a complex multimedia performance in which viola, video, photography, soundscapes, live-electronics and live processing of pre-recorded sounds interact with each other in real time, all of which intersect in art, science and technology. The paper describes the technical and aesthetical aspects of the work.



Figure 1. Examples of close-up images from tree cortices in ‘Wooden Worlds’, 2010, Claudia Robles Angel, photographic media, Copyright Claudia Robles Angel.

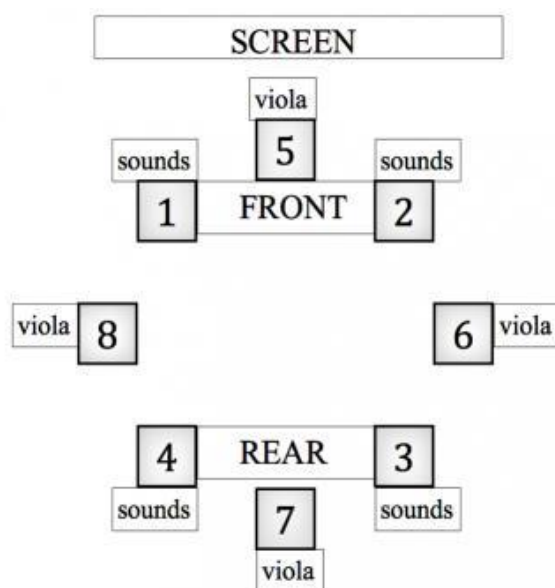


Figure 2. Octophonic sound distribution for ‘Wooden Worlds’.

INTRODUCTION—AESTHETICAL ASPECTS

This paper describes the intention, aesthetical principles and technical aspects of 'Wooden Worlds', an interactive audiovisual performance by Claudia Robles Angel and Javier A. Garavaglia. The piece is a multimedia performance developed from several different sound and visual layers, all of which interact with each other in real-time. Together they create an atmospheric constellation. The attention of the audience is challenged by the piece's audiovisual elements, which in most of the cases are not recognizable at first sight. The role of the viola live on stage acts as an element of synergy between the diverse audiovisual elements, with musical composed and improvised passages. The performance requires two computers on stage running both the software package MAX/MSP/Jitter for real-time interaction.

The piece works with a world of sound and image, which is directly or indirectly connected to wood, particularly, in the way wood appears in nature, namely, in the form of trees or of tree cortices. Nevertheless, the idea is not only to show wood in its naked reality, but also to use images and objects of particular forms and characteristics, which, whilst made of wood, cannot immediately be recognised. One of the techniques utilised herewith is that of the 'close-up,' which consists of the shooting of surfaces at an extreme proximity, resulting in pictures showing those surfaces in a meticulously detailed manner. The resulting images, normally called 'close-up photography' or 'macro photography,' are usually shot by zooming or, most likely, by the usage of macro lens. In 'Wooden Worlds', this technique is utilised to show extremely close details of wooden surfaces, which, in many cases, are not recognisable as such at first sight. The intention is to produce a 'haptic' image, in which the observed object can be de-contextualised, allowing a free and open interpretation by members of the audience, who can have the feeling of 'touching' the images with their eyes. The word 'haptic' has its root in the Greek word HAPTOS (ἅπτω), which means to touch or to fasten. This type of visual conception is a fundamental aesthetical position of Claudia Robles Angel, one of the authors herewith, who seeks to transport the tactile sensation to the photographic image, approaching the object as much as possible, thus inviting to use the eyes to feel and not only to see. This usage of the word 'haptic' in visual arts (image and moving image) has its roots in Deleuze: [1]

"Where there is close vision, space is not visual, or rather the eye itself has a 'haptic', non-optical function: no line separates earth from sky, which are of the same substance; there is neither horizon nor background nor perspective nor limit nor outline or form nor center; there is no intermediary distance, or all distance is intermediary."

Following this interpretation by Deleuze, the term 'haptic' is not used in 'Wooden Worlds' in the same sense as in 'haptic interaction', which is the type of interaction produced by touching devices, as defined by Hermann and Hunt. [3] The usage of the term in this performance is implied aesthetically, with no reference whether to the interaction itself, nor to the interfaces used, as no interaction in this piece occurs by the act of touching devices or interfaces. By making possible to 'perceive the imperceptible' through 'haptic images', the audience is immersed in a virtual space of images and surround sound, in which the material 'wood' is constantly alluded to.

The sound components in 'Wooden Worlds' have two sources: (a) pre-recorded concrete sounds and (b) a live viola on the stage, mixing fully composed passages with improvisation. The pre-recorded sounds were obtained during nightly recordings of the rainforest in South America. The richness of this nightly

natural 'soundscape' was paramount to the general sound conception of the piece, as it helps the listener to become part of the immersive virtual environment of the performance. The concept of 'soundscape' is herewith referred to as defined by Truax: [4]

"A soundscape is an environment of sound (or sonic environment) with emphasis on the way it is perceived and understood by the individual, or by a society. It thus depends on the relationship between the individual and any such environment. The term may refer to actual environments, or to abstract constructions such as musical compositions and tape montages, particularly when considered as an artificial environment."

This feeling/sensation of a natural sound-dome inspired the acoustical space in 'Wooden Worlds,' which, while still following the generic description of the term by Truax [4] (quoted above), creates an immersive environment during the performance by transforming those sounds in real time instead of making 'a musical composition' or a 'tape montage' as in Truax's definition. [4] The soundscape idea in 'Wooden Worlds' is technically aided by the octophonic sound, which surrounds the audience in the complete darkness of the concert venue creating a unique atmosphere between natural and virtual environments.

The form of 'Wooden Worlds' was conceived as an arch, with a climax at its golden mean. The usage of the golden mean creates the impression of a quasi-biological cycle, which begins and ends in complete darkness with the same type of audio material (insect sounds), but which evolves towards a climax, in which all forces interact, fading gradually out to complete darkness in the last third of the piece.

1-INTERACTION ASPECTS

The interaction of the piece was programmed in three dimensions: (a) live-electronics, (b) video interaction with the viola, and (c) interaction via a MIDI controller. The two laptops must connect (both with a different fixed IP address) with each other via Ethernet using the MAX object 'udpsend.' The first computer acts as the master, generating SMPTE Time-code, which is then transmitted to the second computer for synchronisation purposes. The master is in charge of several DSP functions for the viola's live-electronics. The second computer contains pre-recorded rainforest sounds and a library with all of the images; it interacts via a MIDI controller with (a) the pre-recorded sounds (through DSP processes programmed in MAX) and (b) the real time manipulation of the images (via 'Jitter'). Both computers display the SMPTE time from the master computer, to allow for an accurate performance throughout the entire piece.

Full automation of live-electronics processes, as explained in Garavaglia, [2] had to be used up to some extent herewith, mainly because of the extreme complexity of the performance. Full automation is partially used in the video interaction too, mostly in those passages in which both the pre-recorded sounds and the visual part need manipulation via the MIDI controller. It proved extremely difficult to manage the totality of these processes without some degree of automation. However, and given the partially improvised character of some sections, it was decided not to fully automatise the totality of the performance; instead, only those passages requiring a considerable amount of manipulation of the interactivity were automatically programmed.

Pitch and amplitude from the viola were the only parameters selected for the interaction with video. To read them, the first computer uses simultaneously two algorithms: the first performs pitch recognition

of the sounds of the viola, while the other measures their amplitude. The actual values of these parameters proved to be rather inconvenient for the mapping processes needed on the second computer in order to manipulate processes for the video sections of the piece. Hence, pitch values were multiplied by factor 10 while amplitude values were multiplied by factor 10000 before being sent to the second computer and mapped. These big figures allowed for a smooth interpolation of the diverse video parameters, without any noticeable rough changes in the video effects occurring. In this way, the viola's amplitude values were scaled from 500 (a number that proved to be rather efficient in avoiding unnecessary soft amplitude data) to a maximum of 10000. For rotation effects, these figures were mapped to 0.1 – 50.0 in the second computer for the Theta parameter (the rotation angle, measured in radians) of the 'jit.rota' object in 'Jitter'. The frequencies were mapped from 1300 (130Hz) and 50000 (5000 Hz) to 1.0 and 0.0 respectively for the zoom parameter (horizontal and vertical). Another type of interaction viola/video is the mapping and scaling of the amplitude values between 0.45 and 0.1 in order to change the temperature colour in 'Jitter'.

With regard to the live-electronics processes, they are divided in two sets: those in the master computer for the viola and those in the second computer for the pre-recorded sounds. The viola's live-electronics include the following DSP functions: ring modulation of two sources via two *Comb* filters, delays, reverb, convolution, granular synthesis, live-recorder/player and a 'spatialisator'. Sounds coming from the output of the ring modulator, the delay unit, the convolutor and the sample-player are sent in a circular or localised automatically programmed surround sound (4.1) using the 'spatialisator'. Another set of live-electronics was programmed for the second computer, which works mainly processing insect sounds from the rainforest. This second set includes: spectral extraction, comb filters, pitch shifting, chorus (for pitch or voices transformations) and granular synthesis. This second computer also includes spatialisation in 4.1 with circular movement (increasing or decreasing the speed between changes of loudspeaker during the performance at the will of the performer, with the intention of creating at certain moments an intense feeling of rotation) as well as localised distribution of sound.

2-VISUAL ASPECTS

As explained earlier, the principal technique utilised for the visual conception is that of the close-up, with several of the pictures shot using extreme zooming. The main type of image is that of the cortex of several and different trees, which were collected in the last ten years from many different types of vegetations, mostly Europe and the rainforest in South America. Other pictures stem from complete and isolated trees in nature, shot mostly in diverse regions of Europe.

The main intention of using close-up images of tree-cortices is to resemble surface areas, which seem to be borderless, as, due to the closeness of the shots, there is a complete absence of perspective. Hence, these surfaces become eternal territories in which they lose their attributes, transforming themselves from object to landscape. Through these images, 'Wooden Worlds' invites audiences to immerse themselves in a visual territory created by wooden textures mixed with different types of trees with diverse structures. Figure 1 shows two of the many close-up images used in 'Wooden Worlds'.

As all images used in the piece are included in some kind of interaction, they were all stored in a library in the respective MAX patch; most of them are selected randomly during the performance, with the exception of a few, which were pre-selected. At some moments, these surfaces emerge without any visual effect applied; at some other, however, effects such as, for example, colour and heat changes (programmed in 'Jitter') are introduced.

As an example, in the first six minutes, the performance begins in complete darkness and only with nightly sounds of insects, suggesting a typical new moon night in the rainforest; very gradually, the ambience light is increased by little grains populating the screen using the 'jit.noise' object, which creates a matrix full of random values in 'Jitter'. After a while these grains are transformed into the 'haptic image' of the tree cortex shown in Fig. 1 (left), creating an abstract landscape made of wood.

Besides these images, there is one video post-produced with the software 'After Effects' from two images: a wood cortex and a tree. It begins with an extremely detailed close-up of the cortex, slowly zooming out and thus, revealing the entire structure, which resembles a woman stretching the arms as if crucified. The video was produced to interact with the viola by modifying the playing speed via the pitch data from the viola, in order to create a tension through the extension of its duration. Controlling the speed with the viola frequencies produces herewith the effect of 'zooming-out' the image according to the music.

Other images were faded with the resulted rotated image with 'Jitter's jit.xfade' object to create a feedback continuously changed by the Theta parameter and by zooming (horizontally and vertically). This feedback effect creates a visual and chaotic multiplicity that is reinforced by the rotation parameter, which can be slow or fast, according to the music played by the viola. Another type of interaction viola/video is the mapping and scaling of the amplitude values between 0.45 and 0.1 in order to change the temperature colour in 'Jitter'.

3-SOUND AND MUSICAL ASPECTS

The sound and musical aspects of 'Wooden Worlds' include two main sources: pre-recorded concrete sounds and a live viola. For the latter, some sections were fully composed whilst other sections were left for improvisation. The pre-recorded sounds, based mainly on sounds produced by insects, were obtained in several nightly recordings in a tropical part in South America, in the town of Girardot (Colombia) and at the Amazon rainforest (Colombian side). As usual in tropical areas, there are plenty of insect sounds during the night, most of which are produced on, inside or close to wood. Temperatures in Girardot are normally around thirty degrees Celsius (average). The constant heat, together with a rather high degree of air humidity (in some parts of the Amazonas, air humidity is around 94%) are ideal climate conditions for a concert of insects' sounds and of other types of lives.

The viola (which is mostly made of wood) has a pivotal function across the entire piece as it interacts with other audiovisual materials of the performance: on the one hand, it interacts with the pre-recorded rainforest sounds and with sounds recorded live during the performance through typical DSP functions in real time programmed in MAX/MSP; on the other hand, it also interacts with the video part, as explained earlier. Sound interaction is included with the intention of either imitating the pre-recorded environmental sounds (mainly based on sounds made by insects) or to be combined with them. Therefore, the music composed for this type of interaction is that of short instrument actions (many of which are of undetermined pitch), that are supported mainly by sounds such as bow scratching the strings, harmonics or sounds obtained by knocking the instrument, to mention just a few. Most of these are of improvisatory nature, reacting live to the insect-sounds.

As the second type of interaction required a much more careful planning, the music for it was fully and carefully composed; here the viola must take control of different video parameters, some of which require a fixed duration and therefore, accuracy by playing. The parameters read from the viola for video-

interaction are pitch and amplitude. A clear example is the 'Elegy', which starts in the score of the piece at 00:12:15:00 (SMPTE time). The image here is the post-produced video introducing the image resembling the form of a crucified woman. The 'Elegy' was composed with this image in mind, with the video starting with a 'haptic image' (a close-up of a tree cortex), which moves slowly forward until the full image of the 'woman-tree' is displayed. This slow revelation was explained in section 2 above.

In the last section of the performance, the amplitude and pitch of the viola control other video parameters, namely a feedback of the original image combined with a zoom (via the viola's pitches), which is added to a rotation effect (controlled by the viola's amplitudes), creating a repetition and multiplication illusion of the image within the screen with a tense and chaotic visual result. During this section music, sound and image are improvised by both performers within a fixed and planned length.

With regard to the audio output of the piece, each computer is connected via Firewire to an audio interface, with a quadrophonic output each. This division allows for a clear and separated space for each of the sound sources (the pre-recorded natural sounds with their DSP processing and those from the viola, with its own DSP live-electronics). The octophonic settings are described in figure 2.

The piece was world premiered during the Kölner Musiknacht 2010 in Cologne, Germany (Kunst Station Sankt Peter, 25.9.10).

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SOUNDWWWALKS

Bernhard Garnicnig

Computer networks and cities both are social spaces that have emerged as material spaces where lives are lead and work gets done. While extensive studies on the Soundscape have been undertaken in the past, the sonic properties of network spaces have been left unconsidered and thought to be without sonic properties. The panel is an investigation towards an Acoustic Ecology of Networks and the WWW as interface and material for live performance.

Soundwwwalks are an emerging genre of live browser-based performances using <EMBED> improvisation, plugin sound-collage and multitab mixing, shamelessly blending the traditions of pro-surfing, Soundwalk composition and laptop music.

The performances take the audience on a sonic Detour through the World Wide Web. A Soundwwwalk considers the act of surfing the World Wide Web as form of sonic action.

The artists either perform their Soundwwwalks themselves on stage or transmit their notation, sometimes in real time, to a local interpreter operating the browser.

All performances follow the Soundwwwalk One-Line-Manifesto: "All sound sources must be played in a browser, must not be self-produced and must be publicly accessible."

The above description was part of the invitation I've sent to selected artists in the past, along with details about the date and other circumstances of the performance. So far Constant Dullaart, Joel Holmberg, Peter Moosgaard, Julian Palacz, Jamie Allen, Will Schrimshaw and Ceci Moss have performed the format at various events throughout Europe. [1]

Soundwwwalks were the beginning of an investigation towards the possibility of browser based sound performances. As an artist interested in internet art, sound collage, soundscape theory and improv performances, I started to understand that the World Wide Web has become the largest possible library of sonic artefacts and recordings, considering any sound and video file uploaded to the web any given day as material for sonic ideas and actions. I wanted to explore a way of working with this resource the same way I've used turntables for improv sound collage performances with Albert Allgaier in the past, or I've seen other artists using various objects, tools and instruments. But I wasn't interested in just sampling, ripping, downloading and then mashing with those materials as sound files in standard digital sound workstation environments, detached from their original resource, as mere material outside the context of its source medium. I've found it to be much more interesting to work with the specific qualities, characteristics and phenomena related to the world wide web as a sound source, the network as intermediate space with quasi-acoustic properties and the desktop browser as the interface.

We developed different approaches to Soundwwwalk performances, especially because the invited artists often couldn't physically be at the site of the performance. While the performer would usually come on stage and perform the Soundwwwalk using a standard computer connected to the PA system and a projector, this can also be done through real time communication from anywhere else. A local performer will then execute instructions sent by the "composer" in real time. These come in the form of

hyperlinks and instructions regarding for example volume settings or particular timing requirements. What follows is an excerpt of a performance composed by Constant Dullaart, transmitted via text chat and interpreted by Bernhard Garnicnig live on stage at a Soundwwwalk performance at the interactive Media Art Laboratory Brussels in November 2010. [2]

[12.11.10 22:23:38] constant dullaart: New TAB: <http://www2.research.att.com/~ttsweb/tts/demo.php>
 [12.11.10 22:23:55] bgarnicnig: k
 [12.11.10 22:24:00] constant dullaart: dont press speak
 [12.11.10 22:24:11] constant dullaart: new tab COPY 3rd LADY GAGA ASCII FROM http://hotascii.com/terminal/ascii_lady_gaga
 [12.11.10 22:24:27] constant dullaart: Back to 2nd tab: PASTE! DO NOT CHANGE VOICE, JUST PRESS SPEAK
 [12.11.10 22:24:42] constant dullaart: paste in the att one
 [12.11.10 22:24:52] bgarnicnig: running
 [12.11.10 22:25:10] bgarnicnig: 2nd loop
 [12.11.10 22:25:18] constant dullaart: Open New TAB http://sounddogs.com/previews/25/mp3/222978_SOUNDDOGS__ba.mp3
 [12.11.10 22:25:32] bgarnicnig: running
 [12.11.10 22:25:50] bgarnicnig: -00:20
 [12.11.10 22:26:10] constant dullaart: open new tab: <http://www.planetofnoise.com/midi/morse2mid.php>
 [12.11.10 22:26:24] bgarnicnig: k
 [12.11.10 22:26:29] constant dullaart: COPY PASTE THE FOLLOWING IN THE TEXT FIELD: ANY MEDIUM AT ALL CREATES A NEW PATTERN, A NEW ATMOSPHERE, A NEW ENVIRONMENT OF HUMAN PERCEPTION
 SELECT QUICKTIME! and press "make midi file"
 [12.11.10 22:26:52] bgarnicnig: running
 [12.11.10 22:26:59] bgarnicnig: still loop lady gaga btw?

The sound resources on the World Wide Web are ephemeral, much like the sounds exist in our habitat and environment. Briefly appearing signals and notes, their existence on the archive-in-motion is fluctuative for various reasons: YouTube takedowns enforced by copyright owners, users correcting their represented identities and editing their archives, servers failing, connections dropping, geographical access restrictions etc. Like a train passing and chatting couples passing by on the sidewalk, they appear and disappear. The Acoustic Ecology and the Soundscape Project have studied exactly the specific phenomena, histories and properties of sound found in our habitats. Yet so far, this type of research has not been expanded into the field that is now also a de-facto space where our lives are led, work gets done and social structures emerge: Although the spatial metaphors have been used for networks since a while (think about the volume of a MySpace, the length of a YouTube or the diameter of a CyWorld). The space of computer networks has been regarded as being a space without acoustic properties and sonic phenomena.

Since the 1970s, the World Soundscape Project used the practice of Soundwalk [3] and the term Soundscape [4] as analytical tools for their research of the sonic environment of the human habitat. These terms and methods since then have become independent and widely used artistic practices, Janet Cardiff & George Bures Miller Soundwalk projects [5] and Luc Ferraris Soundscape compositions ("Presque Rien ou le lever du Jour au Bord de la Mer" [6] being popular examples. Through a process of reverse engineering, the Soundwwwalk project is an initial effort towards establishing an analytical

framework for an Acoustic Ecology of Networks, starting with an artistic practice. The experiences and discussions this yields will contribute to a more elaborate jargon and finer differentiations to the field of network acoustics and the browser as potential platform for sonic expression.

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Special thanks to Jamie Allen for the discussions and contributions, which resulted in a collaborative workshop on Net Acoustics at Mullae Art Space Seoul, Korea in June 2011.

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OMNISCIENCE, SURVEILLANCE, DISCIPLINE: THE TRIUMPH OF THE VIRTUAL PANOPTICON

GREG GARVEY

Virtual worlds like Second Life and games privilege a single point-of-view and permit a change of identity thought to be desirable, liberating and fun. Users/players agree to Terms of Service (TOS) – a new feudal regime of ‘soft’ surveillance. Foucault’s analysis of Bentham’s Panopticon applies equally to typical Terms of Service. The mummified Jeremy Bentham, locked in perpetuity in a box, remains omnipresent and omniscient.

The eyes of the Lord are in every place. _Proverbs 15:3

POV

Artists, authors, filmmakers, game design and creators of virtual worlds have at their command a variety of devices to represent the point-of-view (POV) of the observer, character, playable character or avatar. In the long history of visual representation in western, non-western art along with the rise of modernism, contemporary arts but also in technical disciplines geometric perspective is but one of many different approaches. Although it actually distorts depictions of objects it retains the authority of truth. Technical drawing techniques such as isometric projections (or God’s Eye view) and even surrealism have explored alternative modes of representation of perspective.

The Privileged Gaze

Virtual worlds such as Second Life privilege a single point-of-view, i.e. the user. When logged into Second Life a user sees the virtual world from a default viewpoint, which is from slightly above and behind the user’s avatar (the user’s alter ego ‘in-world’). This point-of-view is as if the user were viewing his or her avatar using a (monocular) camera floating a few feet behind it. The user can also choose to see this virtual world from “inside the head” of one’s avatar as if seeing through the eye(s) of the avatar. In effect the user can easily shift from a first person, to third person (their avatar is seen as an other). Using the technique called Mouse Look users can even move that camera completely independent of his/her avatar and become an incorporeal all seeing-eye freed from the bondage of a body.

Scopophilia

This privileging of a single point-of-view matches Mulvey’s notion of scopophilia “a primordial desire for pleasure in seeing.” There is a sense of discovery, freedom and liberation as a result of un-tethering one’s point-of-view from the location of one’s avatar. In Second Life user’s avatars can also fly—long a dream of human kind. Flying affords a bird’s eye perspective on the virtual world. In addition teleportation permits avatars to instantly move (within technical limitations – laggy rezzing) from one location (another sim or simulation) on the grid in Second Life. For Second Life “newbies” this experience is liberating and even ecstatic.

We all live in a Gray Submarine

Jaron Lanier suggests that we tend to think of the brain as a computer and our point-of-view as seen through our eyes as a simple camera:

“The head is a spy submarine sent on a mission to perform a multitude of little experiments to learn more about its environment. These micro-experiments are often carried out by constant, subtle changes of the position of the head. By continually moving our head around in order to scan the scene, we simulate the effect of having far better eyes than we actually do, and in a far wider variety of placements. ...If you immobilize your head in a vise, you will see far less well. If you also stop the motion of your eyeballs, you will soon cease to see at all. The world seems to vanish into gray.”

Escape

Second Life also tempts the user with the lure of transformation and perfection. In Second Life the user's avatar is that body electric that triumphs over the human condition and promises a consumer's paradise of fulfillment. A promotional video on the Second Life web site answers the question of “What is Second Life?” with:

A place to be...

Be different

Be yourself

Free yourself

Free your Mind

Change your Mind

Our Second Selves

In her book *Life on the Screen* Sherry Turkle (1995) documents the hopes, fears, expectations of some of early denizens of the then emerging social phenomena of the Internet. She argues that these technologies bring “postmodernism down to earth,” “refuses modernist resolutions and requires an openness to multiple viewpoints.” In an article for *Wired* magazine she spoke of the virtual: “The anonymity of MUDs gives people the chance to express multiple and often unexplored aspects of the self, to play with their identity and to try out new ones.”

But easily changing point-of-view has ramifications. The practice of using multiple avatars requires a transformation of identity and personality. When a user 'enacts' the identity of a particular avatar, their 'real' personality is masked by the assumed personality. In real life such change can lead to psychological distress. In virtual worlds and games a change in identity or point-of-view is thought to be desirable, liberating and fun.

Two Heads are Better Than One

I have argued that virtual worlds like Second Life may induce a feeling of dissociation in users/players. Users may experience “derealization” (where objects appear unreal) and “depersonalization” (where people read avatar’s appear unreal or robotic) as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). If dissociation is experienced in real life it can be very debilitating and disruptive of normal life.

Reality Testing Is Intact

The clinical diagnosis of either of depersonalization or derealization indicates that “reality testing is intact” which applies to Second Life Residents and gamers. By changing gender, bodily features, proportions and clothing a Second Life resident “enacts” a different personality. With a different personality, especially in the case of gender comes a different perspective on the experience of being “in world.” It is possible residents of Second Life or gamers experience something akin to Dissociative Identity Disorder (DID) which according to the DMS refers to the “presence of two or more distinct identities or personality states” that “recurrently take control” of the user’s behavior. Could the user/player experience some form of cognitive dissonance if there is a struggle to integrate the different personality attributes and gender differences?

Various studies show that avatar selection can have a profound impact on behavior and self-perception both ‘in world’ and in the real life. VR researcher Nick Yee found that research subjects who adopted a taller avatar would out-negotiate those who selected shorter avatars. Commenting on Yee’s work, Jim Blascovich and Jeremy Bailenson conclude, “changes in avatar height changed their (study participants) behavior,” and that the “critical finding is that participants’ self-perceptions changed their behavior.”

Separation of Church and State

Extropia DaSilva considers the question how to manage the separation between one’s real self and a digital person:

“To what extent is a digital person separate from the person who is role-playing them? Many consider it impossible to create and sustain a personality that is substantially different from the RL persona. Others argue that current virtual reality is too crude to enable deep immersion into an alternate identity. As on-line worlds grow in sophistication, it should enable increasingly complex explorations of alternate identities.”

Liberation Theology

The prophets of the singularity see only the upside of multiple selves. With his proposal for the Law of Accelerating Returns Ray Kurzweil has prophesized the advent of the Singularity. We will be able to upload our minds to the cloud based on what Randal Koene terms “advancing substrate independent minds” (ASIM): “Mind uploading is the process of transfer, a process by which that which constitutes a specific mind is transferred from one substrate (e.g. the biological brain) to another (e.g. a silicon brain).” Will we retain our unique minds with different perspectives?

The Problem Concerning Technology

In the Winter 1993 issue of *Whole Earth Review*, Vinor Vinge raises many of the key issues surrounding the significance and impact of the Singularity:

“The notion of ego and self-awareness has been the bedrock of the hardheaded rationalism of the last few centuries.”

“What happens when pieces of ego can be copied and merged, when the size of a self-awareness can grow or shrink to fit the nature of the problems under consideration?”

Know Thy Selves

Extropia DaSilva provides a compelling vision of the coming future of multiple viewpoints:

“By the time mind uploading is generally available, perhaps people will have forgotten a time when a singular self was “normal.” They will be used to multiple viewpoints, their brains processing information coming not only from their local surroundings, but also from the remote sensors and cyberspaces they are simultaneously linked to.”

Exodus

In *Exodus to the Virtual World*, Edward Castronova sees “a hurricane coming” - the fun revolution, which he calls ‘practical virtual reality.’ Castronova points to basic economic theory of time allocation. All things being equal e.g. cost people “will pursue as long as possible activities that please them.” Castronova argues that the domain of synthetic worlds and the domain of the real world are in competition. “Time and attention are migrating from the real world into the virtual world. The exodus will strengthen, I believe. Improvements in technology will make virtual worlds into veritable dreamlands. They will be more fun, for more people. Simple economic theory predicts that in this competition, the real world is going to lose.”

Code is Law

While MMORPGs, virtual worlds and electronic games seek to provide a fun experience, all require that the users/players agree to Terms of Service (TOS). TERMS OF SERVICE according to Castronova fall into two categories: “One set of rules are proscriptions the designers hope players will follow more or less based on their own incentives. ...designers hope that a role-playing community will evolve that will enforce in-character behavior through its own norms.” The other class of rules “are ones that cannot be placed in code but about which the designers are dead serious..... The designers will execute any character that violates such rules, banning the associated account. E.g. harassment of other players on ethnic grounds.”

Lawrence Lessig famously wrote that “Code is law” and what is coded serves to ensure discipline and compliance. Castronova points out that “The cost of law enforcement, and of governance in general, is high now, higher than it has ever been in human history.” “To sustain good government, we either have to pay for people to do it, or figure out ...to automate it. ...The result of automated law in virtual worlds often feels like anarchy. You don’t ever see government—no police, no civil service workers, no mayors, only the occasional “game-master,” who has to come adjudicate problematic disputes. While gover-

nance is not apparent, governing is going on—in the code.” “We already have cameras that capture traffic violations and send tickets. Eventually the traffic light could speak directly to my car and simply prevent it from moving forward when the light is red.” Automated Real-world law is cheap! “Cheapness is a very powerful feature.”

The New Softcore Feudal Order

Rather than liberating TOS is a regime of ‘soft’ surveillance. Most include provisions that content created by users cannot infringe on the intellectual property rights of a third party; users agree to indemnify the owner of the virtual world from liability; all content created by users becomes the property of the virtual world owner and the owner retains the right to cancel a user’s account anytime for any reason. According to Greg Lastowka submission to the TOC is equivalent to a new feudal order: “Like peasants tilling fields around a medieval castle, users will lend their copyright labor and creativity in ways that will build the value of the virtual world platform, often paying for the privilege of doing so.” The end user licenses and terms of use regulate behavior.

Keeping Score

To enforce TOC and to make us feel part of something epic means tracking gamers and gameplay in order to provide feedback and recognition. This sense of the collective, being part of something larger is laudable, perhaps as McGonigal claims truly inspires awe, reverence and even humility. But we are reminded here of Blascovich and Bailenson’s rather innocuous sounding observation detailing the wonders of tracking systems: “The take-home message here is that people’s behaviors in virtual reality (Halo is indeed a virtual world-mine) are tracked, and therefore can be stored, analyzed, and used—for good, bad, or whatever the person collecting the information wants.”

The Ocean of Noise

On August 2, 2002 at the DARPA Tech 2002 Conference in Anaheim, California, Admiral John Poindexter (of the Iran-Contra scandal) rolled out the Total Information Awareness Program, sponsored by the Defense Advanced Research Projects Administration (DARPA). The vision for TIA was vast in scope and comprehensive and continues to this day under different through separate and parallel governmental, corporate and private initiatives.

“The most serious asymmetric threat facing the United States is terrorism, a threat characterized by collections of people loosely organized in shadowy networks that are difficult to identify and define and whose goals are the destruction of our way of life. The intelligence collection targets are thousands of people whose identities and whereabouts we do not always know. It is somewhat analogous to the anti-submarine warfare problem of finding submarines in an ocean of noise - we must find the terrorists in a world of noise, understand what they are planning, and develop options for preventing their attacks.”

In order for TIA to work effectively it must collect in its data mining operation the profiles of non-threats in order to distinguish the threats from the non-threats. Today we now know that the National Security Agency beginning in 2001, with the cooperation of the major domestic telecommunication providers intercepted Americans’ phone calls and Internet communications in violation of privacy safeguards established by Congress and the U.S. Constitution.

LOCATION BASED SERVICES

Today in the United States Apple and Google have launched their own data mining and tracking submersibles into the consumer info ocean of noise. With the spread of location-based advertising, marketing, or other applications both Apple and Google have been tracking the location of smart-phone and computer users. Apple surreptitiously logged the locations of cell phone towers and wifi hotspots adjacent iPhone and iPad users. CNET reported that while Google's Street View cars shot images for Google Earth, the vehicles also "collected the locations of millions of laptops, cell phones, and other Wi-Fi devices around the world."

Mr. Know it all

Google ex-CEO Eric Schmidt declared: "We know where you are. We know where you've been. We can more or less know what you're thinking about." In many ways Eric Schmidt echoes Psalm 139 of the Christian Bible:

LORD, when you look at me you know all about me.

You know when I sit down.

And you know when I get up.

You understand what I am thinking about? (even when you are) far away.

The Police

With the 1983 hit "Every Breath you Take" by the Police, Sting takes us from the sacred to the profanity of stalking. Like the omniscience of God, Sting is letting the object of his affection know that "I'll be watching you."

An ounce of prevention is worth a pound of cure

During an interview in December of 2009 Google Chairman Eric Schmidt served users of the internet notice: "If you have something that you don't want anyone to know maybe you shouldn't be doing it in the first place." This statement perfectly captures late eighteenth century English Philosopher Jeremy Bentham's idea of The Inspection Principle outlined in his proposal for the Panopticon – his "plan for a penitentiary inspection-house." The architecture is the physical realization of the Inspection Principle made possible by "the centrality of the inspector's situation, combined with the well-known and most effectual contrivances for seeing without being seen" made possible by a strategic placement of windows and partitions.

While it would be ideal to have each and every prisoners under "inspection" all the time Bentham acknowledges that is impossible (given limitations of staffing), so "the next thing to be wished for is, that, at every instant, seeing reason to believe as much, and not being able to satisfy himself to the contrary, he should conceive himself to be so." Fear of detection ensures prevention is the essence of Bentham's inspection principle. This operational principle of the Panopticon induces "a new mode of obtaining

power of mind over mind, in a quantity hitherto without example." In his analysis of Bentham's Panopticon Foucault describes the inspection principle this way "to induce in the inmate (user) a state of conscious and permanent visibility that assures the automatic functioning of power."

Here, there and everywhere

Now a trope of popular culture (the reality TV show Big Brother, Cheaters, MTV) the most visible manifestation of the virtual panopticon is ubiquity of security cameras. The London Evening Standard reported in an article entitled George Orwell, Big Brother is watching your house that as of 2007:

"Use of spy cameras in modern-day Britain is now a chilling mirror image of Orwell's fictional world, created in the post-war Forties in a fourth-floor flat overlooking Canonbury Square in Islington, North London. On the wall outside his former residence - flat number 27B - where Orwell lived until his death in 1950, an historical plaque commemorates the anti-authoritarian author. And within 200 yards of the flat, there are 32 CCTV cameras, scanning every move."

Dummy cameras provide the omnipresent threat of omniscience that ensures the internalization of compliance.

Smile We Are All On Candid Camera

Facebook adds over 100 million names each day, which rivals any database that the government might build. Google is not far behind. David Petrou an engineer at Google says that Google facial recognition software can identify the face of someone with a minimum of 17 online photos. With 50 or more Google can determine the person's name in most cases. Consumers willingly opt in this facial recognition software without concern. However, last year, a facial recognition system picked out more than 1,000 cases that resulted in State Police investigations, officials say. And some of those people are guilty of nothing more than looking like someone else.

It All in Your Head

The Brain Electrical Oscillations Signature test, or BEOS, was developed by Champadi Raman Mukundan, was used to win a criminal conviction. Using the scanning system, the accused murderer said nothing. But incriminating regions of the accused's brain where memories are stored lit up when the crime was recounted, ...The judge endorsed [the prosecutors's] assertion that the scans were proof of "experiential knowledge" of having committed the murder, rather than just having heard about it. The implication of such invasive techniques is also on uncertain ethical and legal ground.

Theory of the Future: The PANOPTICON

Invasive scanning techniques and brain implants were once the province of dystopian science fiction. Big Brother was a nightmare scenario of a fictional world that seems improbable in liberal open societies. The natural desire to see, to watch, to record, to remember is being harnessed through social media. The job of surveillance is being done by the consumer and it is fun. Users accept Terms of Service without reading and thereby agree to a regime of enforcement and compliance. Discipline is enforced because users know they might be watched and might suffer the ultimate penalty: denial of service.

The mummified Jeremy Bentham remains omnipresent at University College London. His frozen gaze suggests omniscience. He leaves us with this warning:

"...whether the liberal spirit and energy of a free citizen would not be exchanged for the mechanical discipline of a soldier, or the austerity of a monk? - and whether the result of this high-wrought contrivance might not be constructing a set of machines under the similitude of men?"

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CURATORIAL CULTURES – CONSIDERING DYNAMIC CURATORIAL PRACTICE

Karen Gaskill

This paper will look at how responsive methods and approaches are called for when curating media-art-works, and how they shift the curatorial role to that of an active practitioner.

It will discuss exhibition strategies employed by the author, and how dynamic curatorial approaches can be integrated into mainstream curatorial roles, and how these can subsequently evolve thinking on the presentation and display of contemporary art.



Fig.1. Player Printer, 2006, Simon Blackmore, mixed media. Installation shot. Copyright Karen Gaskill.



Fig.2. Fast and Slow Networks, 2006, Exhibition view. Copyright Karen Gaskill.

“What”, I want to ask, “would it mean to think of art practice as the search for collaborators rather than as the search for an audience?” [1]

The practice of curating is live and temporal. It has shifted dramatically from its anonymous backstage origin within dusty museums to a role at the forefront of modern art, and is responsible for conjuring both a synergy and a dynamic that operates across a multitude of levels. Curation is a rapidly growing practice and discourse that is fundamentally shifting the ways in which we view and receive art.

This paper considers the curatorial role as that of an active practitioner, positioning it at a point of perspective. An excerpt from a recent PhD, this text presents a synopsis of a much longer articulation of the currency of the curatorial role in presenting and contextualising socially-engaged art practices.

Joan Gibbons, in her introductory narrative to the curatorial section of *Hothaus Papers*, reveals how the etymology of the word curate (as in 'curate' as a noun) goes back to the Latin word for care, 'cura', and through the religious art of the middle ages evolved into 'curatus', in reference to the care of the soul. [2] This is a particularly evocative description of the actions of the contemporary curator, as one that cares for our cultural products and their critical significance. Contemporary curators are summarised with a range of descriptive words such as caretaker, facilitator, mediator, catalyst, context provider, collaborator and negotiator. These have come to rise through the continuing prominence of the curator within exhibitions.

Traditionally the curatorial role was to collect, archive and preserve works of art, and was seen as separate from its variable display. Ramirez situates the curator as an internationally recognised expert of the artworld establishment, I quote: "in this elite context, curators have traditionally functioned as arbiters of taste and quality. The authority of this arbiter role derived from an absolute - ultimately ideological - set of criteria grounded in the restrictive parameters of the canon on western Modernism/Post Modernism." O'Neill, in Rugg and Sedgewick, [3] discusses the ascendancy of curatorial criticism since the 1960s, describing the critical shift away from the object of art, to a critique of the space of exhibition. More relevantly, he references the ascendancy of the curatorial gesture in the 1990s and how this 'began to establish curating as a potential nexus for discussion, critique and debate'. The rise of the curator can therefore be tracked through critical requirement. The role has adapted according to paradigm shifts, movements, cultural perspectives, and through the requirements of the work it chooses to curate.

The activity of the curator draws analogy to the Cabinets of Curiosity in sixteenth and seventeenth century Europe. The Cabinet of Curiosity, in its collection and display of often foreign and unseen objects, presented a tightly coordinated and rich tapestry of contexts and histories. Suggested as an early precursor to moving image culture (the notion of an audience roaming through a narrated space) the cabinet provided a specific audience with a metaphorical lens through which to view and understand alternative genealogies.

Such groupings of objects began the notion of storytelling and narrative within displays, and the provision of context and representation. Tony Bennett [4] writes of such museological cultures, 'the space of representation constituted in the relations between the disciplinary knowledges deployed within the exhibitionary complex thus permitted the construction of a temporally organised order of things and peoples'. Thus this aspect of the contemporary curator's role is not new, but through the lack of documentation of our curatorial history, many connections are still to be made.

The focus of the curatorial role has evolved from being that of a "behind-the-scenes aesthetic arbiter to a centralised position on a broader stage, with a creative, political and active part to play in the produc-

tion, mediation and dissemination of art itself.” [5] The practice of collection within museums and galleries still remains the same, with a continual need for the assimilation of art collections and their preservation and display. This ‘time storage’ as it has been labelled, is still massively important in cataloguing and preserving works. A perfect example is media art, where the necessity to archive digital and often ephemeral works is completely reliant on the survival of particular software and hardware. Therefore, to preserve the work, the associative technology must also be collected and conserved by the museum or gallery. The practice of archiving contemporary artworks has broadened relatively with the expansion of practices, and the responsibility of ensuring the future presentation of many works is thus massively reliant on the preservation of increasingly obsolete technical platforms.

Curatorial practice has come to embody one of the most dynamic forms of cultural agency available today. The challenges represented by this role and its ability to affect a series of interdependent areas inaccessible through other, more restricted, modes of cultural practices requires a fluid and multidimensional approach. [6] In the shift from the curator as master planner, Obrist [7] articulates how exhibitions have shifted from a historical approach of order and stability, to a place of flux and instability: the unpredictable. In thinking about the curator’s role at the helm of such uncertainty, it becomes much clearer how the position has evolved and its contemporary requirements shaped. This is also made clearer by the consideration of the types of work curated in contemporary exhibitions in relation to those being curated a century ago. The span of practices is growing rapidly, with new understandings and forms of hybrid practices being established all the time.

Therefore the position in which the contemporary curator sits is one of emergence and flux. I argue that the curator should be continually responsive to the type of work they are curating, if necessary changing their approach and looking sideways are what tactics of display best represent the work in question. The relationship between media art practices and traditional galleries is a recently formed one, with a history of littered with contextual and presentational misunderstandings. The main issue being that historically curation and its contextual knowledge has been developed and orientated around that of the art object. There has been no presentational challenge in displaying the works of painters and sculptors, obviously this is done with great knowledge and experience, but rather the challenge occurs when works come into being that are process-based as opposed to object-based.

As a contextualiser, the curator is often perceived as an “expert on art’s mediation by the sites of its display”; the area of curatorial expertise sits markedly between the “private sphere of the production of art, on the one hand, and the public sphere of consumption, on the other.” [8] However with this expertise comes a responsibility to the artist and their work in parallel to the audience. With experts drawing on their past knowledge of curation has meant that with the proliferation of more dynamic practices coming to the forefront of contemporary art, that this experience is not always relevant. It is difficult to curate work that is process-led with an approach that deals with art objects. So the question for many was how does one go about curating a process that involves audience members to make it manifest and in many cases realise the work. This issue was obvious in many of the early gallery shows, especially those which were not dedicated to media or participative practices entirely, or were solo shows, but were a selected mix of mediums. For me it felt that media works in many such shows were being curated on their physical presentation mediums as opposed to their relational attributes.

At this early point, the display monitor or computer was perceived as the work, it was a physical object, thus it was placed alongside other objects in the show accordingly. I use this as a broad example to iterate a point, and to reveal the difference between the curation of an object for display, where the curator takes into account the space required for viewing and exhibition sightlines, etc, to the curation of a

process. In this, where the physical presentation method is often purely a method of display, and where the essence of the work is revealed by the interaction of a user, viewer, participant, or otherwise, the curator needs to respond and work with the requirements of the piece, effectively curating the social, dialogical and reciprocal characteristics of a work.

The curator's relationship with site and space is ever evolving. Again I cite media arts as a prime example of how such practices have existed away from the formal agendas and white walls of the traditional gallery space. Such practices have always sought alternative spaces, primarily for the space requirements and that the significance of the gallery space is not entirely relevant to the dialogues they present. There have come to be more 'off-site' (non-gallery based) projects in recent years as exhibitions shift away from the white cube's signified emptiness [9] and critically acknowledge the role of site as part of the exhibition's context. I quote Brian O'Doherty [10] here, in order to contextualise Nick Kaye's description above, in his description of an ideal gallery, extracted from his book, *Inside the White Cube*. 'The ideal gallery subtracts from the artwork all cues that interfere with the fact that it is "art". The work is isolated from everything that would detract from its own evaluation of itself. This gives the space a presence possessed by other spaces where conventions are preserved through the repetition of a closed system of values'.

This merging of two critical directions; the white cube space of the object and the site-specific context of spatial works, has seen a new dialogue regarding the aesthetics of the relationship between artwork, place and audience develop. Exhibition spaces now exist 'off the map', and in the world, citing real life as their critical horizon and conceptualising the relationships and processes that occur within this context. (See fig.1).

I consider curation as being about establishing and contextualising a site of exchange: a space where artwork, site and audience converge. The 'exhibition space' exists where these conditions are met, and with Media Practices in particular focuses on the process of this convergence itself. This coming together of social, spatial and critical contexts generates a political space that exists within a wider cultural sphere.

There is no one set example of how media art practices function within a confined space, each performs differently, exerting different pressures on the conditional aspects that both determine and limit their relational capacities. Most works that function well in such spaces are often produced or commissioned to work within such parameters, and therefore are perhaps more site-specific in the traditional sense as they are intrinsically embedded within the site of production. However, such locations differ from their traditional predecessors in that the curatorial process also takes into account the relationship between site and artwork, and therefore is much more reliant on the audience to acknowledge and legitimise the connections made between the two.

This raw space provides a blank canvas for both the curator and artist that can be worked with accordingly to capture the characteristic of what the exhibition seeks overall to explore. Away from the agendas set by gallery spaces and the critical expectations of gallery audiences, alternative spaces reveal a space of potential, a space where anything can happen. This is very much a live space working with the conditions of subjectivity and presence, and dependent on an engagement across all elements. It is in this 'conditional' space that socially engaged and media practices projects sit, where contexts are formed and experience is lived. As an example, Allan Kaprow's *Happenings* are critically positioned by the artist, realised by the audience, influenced by the site, and politicised by the multiple perspectives

and opinions of the participants. This condition of immediacy where a conflux of ideas, perspectives, conditions and experience meet mimics in Kaprow's eyes the grit and texture of everyday life.

Such conditions of immediacy are also opened up through interactive media works and emphasised or furthered by the opportunities afforded by the chosen exhibition site. As suggested, alternative exhibition spaces remove the audience's 'authenticity', permitting them to function in a more natural role. These circumstances allow a public authoring of the exhibition itself, with the public's interaction with artwork and site both contextualising and realising the exhibition as a space of engagement. (See fig.2).

I want to touch on some examples of curatorial strategies that I have been implementing, and how these experiences have informed my knowledge as a curator. From 2005-2009 I directed and curated a small arts organisation called Interval. Based in Manchester, UK, it aimed to support artists using technology in their work through regular exhibition opportunities and networking events. Through Interval I attempted to approach the exhibitions I planned and curated from the perspective of curating the process of the selected artworks. This involved much more consideration of the appropriateness of space and site, and instead of thinking how the physical attributes of the show would be presented, I considered how the social space of each work would function, how they would work in relation to one another, and the potential for dialogue and exchange.

This curation of spaces for interaction and exchange very much shifted my perspective on the potential of exhibitions, and even working in gallery contexts with participative or socially-engaged artworks of all kinds, has reiterated the engagement that the curator needs to make with the 'exhibition space'.

So to conclude; 'Curator' is a term in the constant state of 'becoming' writes O'Neill, [11] 'as long as "curating in practice" is continuously willing a flexible "common discourse" into being'. It can therefore be said that curating is no longer about being somebody else, e.g. curator as negotiator or facilitator, it is about being a 'curator' as understood in discourse. The actions of curating mean different things to different curators, who again work in different contexts and situations, locations and sites. It is very much a cultural commentation role, experimental and discursive, necessarily responsive to socio-political and artistic shifts in a fluid culture. Our evolving curatorial dialogue seeks to embody movement and continuation in its descriptive qualities, and make visible and transparent the links and networks between meanings.

Curating is 'becoming discourse' where curators are willing themselves to be the key subject and producer of this discourse." I consider how Niklas Luhmann's writings on art as a social system, and in particular his articulation of a reflective practice, could be applied to curatorial practice. I suggest that this would compare the action of 'exhibition making' or curatorial practice as being the equivalent of making an artwork. Luhmann understands art as an autopoietic system that is self-referential and recursive. [12] I view curation as a similar thing. Curation enables the space of exhibition to open up new possibilities for dialogue and exchange, with these new perspectives feeding back into the way in which the exhibition is perceived and reflected upon. The 'artwork' or 'practice' of the curator is the exhibition and all of its associated processes, thus again coming back to Luhmann's notion of practice as not being solely concerned with agency but rather the work's understanding of itself and how this reveals possibility for an exhibition to raise questions about itself and its environment.

This becomes relevant when thinking about the broader social, cultural and political remit of curation and its practice. In its responsibility for the collaborative creation of context - that includes the artist/s; the artwork; the concept of the work and its representation; the facilitation of an exhibition's content;

orienting the body of work, and finally the space of engagement with an audience - curatorial practice is very much the actions of a bricoleur. In reflecting the messiness and complexity of everyday contexts and building a knowledge formulated by experiences and relationships, the curator is a responsive practitioner; a collaborator in art's social relations.

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CYBISM AND DECODING THE LETTER: BUILDING AFRO-FUTURIST STYLED GAME LAYERS ON TOP OF THE WORLD

Nettrice Gaskins

The realm of street art is now a thriving knowledge culture that merges specialized forms of representation: alphabets, drawings, paintings, films/videos, choreographic notations based on programming languages, hardware, software, etc. This paper examines these guideposts that provide a basis for user-generated, performative, virtual and physical site-specific content that cross multiple disciplines and dimensions on emergent game platforms.



Fig. 1. Museum of Contemporary Art Los Angeles, Battle Station, 2011, studio installation, Photo credit: N. Gaskins (author).

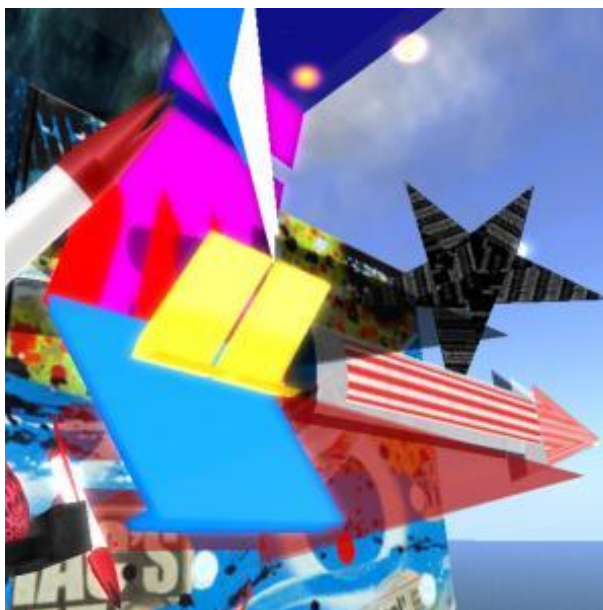


Fig. 2. Alternate Futures: Afrofuturist Multiverses & Beyond, 2010, virtual 3D Gothic Futurism simulation, Copyright N. Gaskins (author).



Fig. 3. *Graffiti Analysis*, 2011, personal tag, Copyright N. Gaskins (author).

“Every new technology disrupts the previous rhythms of consciousness.” – Joseph Nechvatal [1]

To walk into the *Art in the Streets* exhibition at Geffen Contemporary in Los Angeles’ Little Tokyo neighborhood is to enter the realm of pure unadulterated street art. It is also to experience what is now a thriving knowledge culture that merges specialized forms of representation: alphabets, graffiti, films/videos, choreographic notations based on symbolic, linguistic and scientific formulations, programming languages, hardware (robotics, handheld devices), software, and so on. [2] This work emerged from a culture that has grown through the creation and application of forms that reflect the imaginings of urban futurism-inspired, hip-hop-styled texts that are rich in imagery and metaphor. These artists use the urban environment as their canvas that provides a basic framework to contextualize and evaluate street art production. This article expands upon art and media-related discourse of a kind of ontology, or metaphysics of presence to describe what takes place with the body, itself, not just the body that is embedded in public spaces but also how bodies are coded by society. A code is a rule for converting a piece of information (letter, word, phrase, or gesture) into another form or representation (one sign into another sign), not necessarily of the same type. This article aims to present a deeper, multi-layered translation of afro-futuristic, “wildstyle” graffiti and performance decoded through embodied new media, virtual 3D and augmented reality environments.

Modern graffiti and street art pioneers, many whose works are featured in *Art in the Streets* and elsewhere have provided artistic guideposts fueled by the increasing ubiquity of digital media that offer opportunities for its users to deviate from canonical practices of art and represent a complex syntheses of scientific and technological extensions of the body embedded in material and virtual spaces. RAMMELZEE was an artist and theorist who lived for twenty years in a Tribeca studio loft he nicknamed the *Battle Station*. [Fig. 1] Museum curators transported his studio to the Geffen Contemporary for public viewing. *Battle Station* contains rarely seen video, sculpture, images and sound. It is part of what the artist

called “gothic futurism,” his urban, afro-futurist manifesto that embeds history, science (quantum physics), philosophy, science fiction, mathematics and technology. [3] The centerpiece of this production is “Gasholeer,” an upright, freestanding urban warrior figure covered in armor worn by RAMMELLZEE during live performances. “Gasholeer” represents this graffiti artist in his futuristic, urban realm – merging urban bricolage and detritus, mass media and street culture. The artist, embodied as an avatar, is surrounded by customized instruments and systems called “letter racers,” “monster models,” and “garbage gods” – objects designed to decode information into specialized forms of representation and invite visitors to become immersed in material and metaphysical space endlessly open to transformation and change. [4]

Modern graffiti comes from anywhere and takes whatever is needed from the environment. This practice relies on sign relations that consist of specialized art forms (tags, burners, etc.) that also describe aspects of presence, objects of reference and mental representations of spatial perception. RAMMELLZEE’s artworks consist of formulations on the juncture between black and Western sign systems (afro-futurism). [5] He realized that concepts are tools – technologies that could be crafted outside of the canon to make palpable specialized forms of knowledge that push the means of artistic production into the hands of outsider artists. His “panzerized” art forms, as cultural texts, are a basis for a symbolic and semiotic structure that relies on social interstices that mark or inscribe upon the body specific signs generated by society. RAMMELLZEE was part of a movement to create a space in which to untangle lines that cut across the past, present and future to establish an empirical framework. This framework is semiotic insofar as its structure depends on the process of perception and experience. Such development has largely been unexplored in scholarly discourse and is open for interrogation and debate. In her analysis Andrea Mubi Brighenti asserts that the common denominator that runs through graffiti, as an interstitial practice, is the materiality of the practice itself. [6] This article proposes a new form of analysis and interpretation based on the creation of new and alternative media content.

RAMMELLZEE appropriated and decoded letters of the Greek alphabet to create distinctly new art objects, transforming classic signature visual motifs into mechanical (letter racer) systems. Second Life (SL), an online, virtual 3D world, offers tools to re-appropriate and re-mix similar artistic constructions. As part of a Second Life art exhibition sponsored by the IBM Center for Social Media, I simulated portions of *Battle Station* and, through the use of in-world tools, constructed objects that were textured and assembled to simulate modern graffiti semiotics. [Fig. 2] Built into the SL software is a three-dimensional modeling tool based around simple geometric shapes that allows artists to build virtual objects. There is also a procedural scripting language, Linden Scripting Language, which can be used to add interactivity to objects. Users/avatars navigated this wildstyle-inspired, perceptually immersive 3D graffiti by virtually walking on, through, or around the objects, some of which were scripted to provide information such as links to external web sites and note cards with text that could be stored in an inventory. Extruding two-dimensional graffiti and incorporating interactive elements reveals new ways to decode specialized forms of representation that break set rules and establish new practices that extend viewer/user participation.

Imagine how much richer and multi-layered the experience of being in *Battle Station* could have been – exploring wildstyle graffiti and street art forms – using augmented reality (AR) tools on mobile devices. Visitors would have experienced a different *Art in the Streets* exhibition (at MOCA LA) if, while using their iPhones or Android smartphones to capture images, they had access to AR content that translated RAMMELLZEE’s complex vernacular. This multi-layered scenario is what makes virtual 3D and augmented reality environments promising for contemporary art. Graffiti artists, as part of a production process, encode, or take information from subcultural experiences, living in urban spaces and converting

this psychogeography into specialized symbols (graffiti tags, dance poses). Virtual 3D and AR tools can decode these symbols, as part of a generative and reverse artistic process, converting various symbols into information understandable by others. Emerging technologies create layers of information that explore the far-reaching implications of evolving epistemology and empiricism based on the body as a site for communication, represented in material and virtual domains and by highly stylized structures and code.

Along with the development of perceptually immersive, virtual 3D worlds like Second Life, augmented reality (AR) is becoming more accessible and new uses continue to emerge as tools for creating and customizing applications become easier to use. The layering of information over 3D space produces new ways to experience the world, as blended reality, that is fueling the broader migration of computing from the desktop to the mobile device, bringing with it opportunities for broader viewer/user dynamic engagement with social, digital, and mobile media. Contemporary artists are being encouraged to view their mobile phones, cameras, iPods and tablet computers as tools for production and display. These tools can be used to simulate real world issues and explore complex concepts in ways that are more 'user led' and increasingly participatory and collaborative. Graffiti psychogeography reveals creative practices that twist, interlock, converge and diverge media texts in a type of rhizomaniac, capitalistic and cultural schizophrenia. [7] Wildstyle, which in graffiti describes a complicated piece constructed with interlocking letters, also characterizes the development of experimental art forms, computer-controlled assemblages, and augmented, virtual reality tools. [8]

Evan Roth's *Graffiti Analysis* is one of several virtual graffiti applications that utilize motion and marker tracking, computer vision technology and programming to record and analyze graffiti art. The artists' gestures are captured, processed and used to generate projections and overlays that appear on the surfaces of structures in physical spaces. [Fig. 3] Here, complex graffiti vernacular is represented in the language of information analysis, offering a system for greater understanding of a highly coded form of creative expression. [9] This development is further explicated by "cybism," a term that describes a "system dynamics with a hybrid blending (cybridization) of the computational supplied virtual with the analog." [10] As defined and coined by artist-theorist Joseph Nechvatal, cybism is a "new sensibility emerging in art respecting the integration of certain aspects of science, technology and consciousness – a consciousness struggling to attend to the prevailing current spirit of our age." [11] Nechvatal claims that cybism can be used to characterize our understanding of where cultural space is developing today. His notion blends the virtual and augmented with the analog to be used as a theoretical basis for newly imagined realities that merge in cybism.

This development merely scratches the surface of what is possible with new and alternative media technologies and further expands the scope of experimental critical media theory. Performance and motion capture, blended reality, and wildstyle abstraction reflects an evolving knowledge culture (graffiti, breakdancing, b-boying) that employs verbal, written, artistic, or performative representations of media in the body. Doze Green's paintings translate complex metaphysical concepts that resonate with urban futurism, such as the "possible manipulation of energy and matter to create a timeless space." [12] Bodies in motion effortlessly translate into symbolic, linguistic and spatial formulations. The performative language of graffiti – windup, tilt, float and freeze – generates dance poses and letters that are manipulated into recognizable forms. Graffiti is represented in the language of information analysis. "King of Style" Kase 2 enabled a whole generation of artists to break from traditional forms into a more modern complex lettering system based on computer technology. Artists and writers who copied and amended each other's designs devised a variety of methods. Freelance hacker Josh Nimoy designed a Kase 2-inspired brush style for Graffiti Research Lab's L.A.S.E.R. tag system.

Futura (formerly Futura 2000) was one of the first graffiti artists to translate the wildstyle aesthetic into other art forms as a synthetic purification and intensification of certain ideas and visual elements. In the nineties he gravitated to the World Wide Web to create an archive of original work and to communicate with users on multi-dimensional levels. Cultural catalysts and practitioners have charted the development of modern graffiti, from the subway system to new media systems. Futura writes, “To keep in step with the fast pace of communication and information sharing ... what had started out as playing in subway tunnels had progressed into midnight forays deep in the interiors of the system.” [13] Futura is describing the emergence of a “cybistic zeitgeist” that seeks to capture specific aspects of graffiti and street art in order to formulate new inscriptions and representations (layers) that can be built upon and worked with to expand creative expression and innovation, through the use of game and mobile technologies. The acquisition of this work is epistemically advantageous and can facilitate a broader understanding that extends to electronic art and emerging, experimental game technologies.

The Modern Museum of Art (MoMA) interviewed artist Lee Quinones who discusses the development of the graffiti artist’s signature (tag). [14] Quinones demonstrates on paper RAMMELLZEE’s complex process of abstracting letterforms and transforming them into systems that have influenced contemporary graffiti artists such as SEEN, TWIST, AMAZE, KETONE, JONONE and KATSU who have had their tags captured and saved as Graffiti Markup Language (GML) files, a digital standard used by *Graffiti Analysis* and other applications. *Tagged in Motion* synchronizes gestural movement with an augmented layer of laser graffiti tags. This augmented reality performance combines graffiti art and its virtual 3D representation. Equipped with a handheld augmented reality tool, artist DAIM sprays graffiti into empty space. Three motion-capture cameras record his position and the movements he executes with a virtual spray can. The resulting data is shown to him in real time through a pair of video glasses – as free-floating three-dimensional graffiti in space. [15] *TagDis* is an iPhone app that lets its users design graffiti and street art using Augmented Reality technology. [16] Players see their tags – and those of other players – in the real world. This development will continue to converge on emergent game platforms, some of which will continue to expand the potentiality of new media to solve real problems, map specialized art forms and bring together disparate communities that share an interest in these systems, whether found in code, museums, or on the street.

A case study for real world problem solving is the *Graffiti Grapher* application created by Rensselaer Polytechnic Institute (RPI). [17] Ethno-mathematician Ron Eglash and his computing team developed this web-based applet that uses graffiti artifacts and artistic practices as a means to engage learners in STEM (science, technology, engineering and math) concepts. *Culturally Situated Game-Based Learning* is an innovative planning project (launching in fall 2011) that merges successful and proven models of game-based learning with culturally situated digital media strategies to help bridge the gap in STEM learning among under-represented minority students and non-traditional learners. This will be achieved using *Graffiti Grapher* and other existing “culturally situated design tools” and applying them to existing virtual 3D and augmented reality toolkits created at the Georgia Institute of Technology’s Experimental Game Lab and by the GVV Center’s Augmented Environments Lab (AEL). [18]

Experimental, emergent game-related technologies are the next layer of development and require careful investigation. This presentation reveals resonances of a thriving knowledge culture on emerging, experimental game technologies. It is a multi-faceted attempt to position this production in a broader cultural, historical and theoretical purviews of which audiences that are familiar with certain aspects are already cognizant. This move ultimately aspires to inscribe, or even imagine a potential place for urban, street art in the next phase of conceptual and technological innovation to inform a more meaningful

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BRINGING THE IMAGINARY BACK INTO PLAY

ALISON GAZZARD

The term 'ludic' can be linked to many aspects of play and games, but what does it mean to be playful? Using examples of various augmented reality game, this paper will examine the role of mimicry in play as a way of understanding the ubiquity of ludic interfaces in light of our real world explorations. It will also highlight the importance of exploration and discovery in how we perceive, perform and create spaces of playful interaction.

"If there is one significant contribution of digital technology to gaming, it is to have reconciled competition and make-believe..." (Ryan 2007)

The term 'ludic' can be linked to many aspects of play and games, but what does it mean to be playful and where and how does this play occur? It can be seen that instead of being fixed experiences, digital games instead act as platforms for various experiences. Mobile phones, in particular the rise of what are commonly described as 'smartphones', have allowed for an increase in 'app' culture. Games are available for free through the various app stores (such as the Android market place or Apple's 'App Store') or for reasonably small amounts of money. Although handheld gaming has been around for decades, most notably through the various incarnations of Nintendo's Gameboy system, the ease of downloads and increasing integration of games with mobile phone devices has allowed these games to reach greater audiences without the need for separate, dedicated hardware.

In terms of hardware, smartphones also contain other inbuilt systems such as gps receivers, digital compasses, gyrometers, cameras, data connections and so on, once again allowing the game experience to change in different ways. Writing about non-digital games in the 1950s Roger Caillois distinguishes between 'ludus' or what is often seen as purely ruled play and the act of exploration, discovery and the pleasure of 'paidia', the notion of "...wild, free-from improvisational play..." It is not to say that these categories remain as fixed, binary oppositions, but instead work as a sliding scale of playfulness across a range of game playing experiences. Alongside his categories of "ludus" and "paidia", Caillois (1958) distinguishes between "agon, alea, mimicry and ilinx", equating to competition, chance, make-believe and vertigo. Although it is possible to understand these categories in light of non-digital games, what happens when real and the virtual start to combine, as in the case of augmented reality gaming? The growth and development of augmented reality (AR) applications through both videogames and smartphones now allows for the player's real world landscape, whether that be indoors or outdoors, to be transformed at the touch of a button. AR technology combines the world viewed through the camera screen with a layer of fictional objects allowing this technology to enhance and create different acts of play.

As it stands, augmented reality currently offers two main modes of delivery, either through markers, or through using location. The game *ARBasketball* released on the iPhone is one such example of using a marker-based system. Although it is played on a portable phone device, the user is required to print out a marker from the creators website before they can start playing. The marker then transforms into a basketball hoop once positioned in front of the camera (with the *ARBasketball* application running). Here, both the paper marker and the resultant image on screen link together as props to create the fictional and imaginary world, the notion of "mimcry" as discussed by Caillois. Wherever the real life

marker based prop is moved to, so to is the fictional basketball hoop, bridging the gap between the two realities and creating a portable game experience.

As Kendall Walton (1990) notes, "Props are generators of fictional truths, things which, by virtue of their nature or existence, make propositions fictional". In discussing the scenario of children playing a game of make-believe where tree stumps in the forest turn into imaginary bears, Walton discusses the underlying agreement of all players that stumps are part of the imaginary fictional world. In this instance we can see the applications of augmented reality acting as a toolbox of props that can be used to create different play experiences. Instead of having to imagine the world of stumps as bears, it is now possible for the technology to turn this into a displayed (virtual) reality. Although props can be present in other digital games, augmented reality is allowing for a layering of a prop, transforming a real world space into an extended playground of possibilities. The recently released *Ball Invasion* iPad2 game is an example of this. The game relies on the difference in patterns within the real world space to layer an augmented gamespace over the top. In calibrating the application, players are then able to play various shooting games, bouncing virtual balls at different targets within different depth layers. The balls also interact with the surrounding real world landscape, animated to seemingly bounce off the walls of the real world space when the virtual targets are not hit. The world created is pure mimicry, an imaginary world created through the combination of technologies. In doing so this standard game of chance is combined with a space of imagination, a combination of categories seen to be 'forbidden' by Caillois, stating "simulation and chance are no more susceptible to mixing" (p. 73). This is true of any digital game, where the simulation is created by the technology as a platform for a different kind of playful experience as once imagined by Caillois. The same can be said of 'ilinx' or vertigo, and its forbidden relationship with competition and rules. The portable nature of the mobile phone combined with the locative aspects of augmented reality can see player's moving through periods of vertigo, spinning round playfully trying to find new fictional spaces to explore.

Applications such as *Layar* (an augmented reality browser) allow for the creation of these playful experiences, often recreating our childhood memories of fictional worlds, imaginary places and ideas surrounding new possibilities of play. Instead of relying on markers, *Layar* allows different augmented reality games to be played through using location-based data and the digital compass for direction. An example of this is the *Layar* titled *ScanvengAR Hunt*. Much the same as a normal treasure hunt, players have to find the objects displayed on screen as they explore the area around them. Objects are marked such as octopuses and swords, creating a world full of props for our imaginations. These props can be used as the starting point for new play experiences as the portable playground of the mobile screen extends the world around them. Although the props may remain the same, the location of play changes, creating new meanings and experiences. The game functions in much the same way as the real world experience but can be updated with every re-load of the application refreshing what objects are shown and where they may be found. The turbulence or 'ilinx' combined with the mimicry of play return to these games with these various layers. Player's can now stand up, spin around and furiously attempt to shot the virtual spaceships appearing on screen, found all around the player. However, this play can be competitive, both between players and by individual players competing with themselves, allowing for the categories of ilinx and competitive ruled play to emerge through the possibilities of the platform.

This is the key distinction of playful digital media; it is now possible for players to use these applications as platforms. Players can create their own play experiences through extended layers of their own imaginary and much of this play comes through the initial exploration of each application's use. Augmented reality, in particular, allows for an exploration of both the real and virtual world spaces to see what they can offer on each play. AR creates the possibility of two layers of fiction intertwined with the real world,

that of the virtual depicted fiction and the extra fiction created by the player's own imagination. Together these allow for various types of play experiences to evolve out of the props on offer within the interface and the simplistic nature of many of their designs allow for different types of game and play scenario to emerge. As has been briefly outlined above, the platform(s) of play are now accessed through the mobile interface, the "space of possibility" (Salen and Zimmerman 2004) continues to be opened up to players as they seek to bring the imaginary back into play.

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LOCATING THE LOCAL/MAPPING THE NETWORK

ALISON GAZZARD

The project seeks to understand the changing landscape of local areas through location-based applications. The changing nature of the map is captured at different points in time as a way of analysing the ephemeral landscape of data depicting the opinions, locations and imagery left as digital memories or tokens by those within the area. The narrative of place is re-examined in light of this user-generated content.

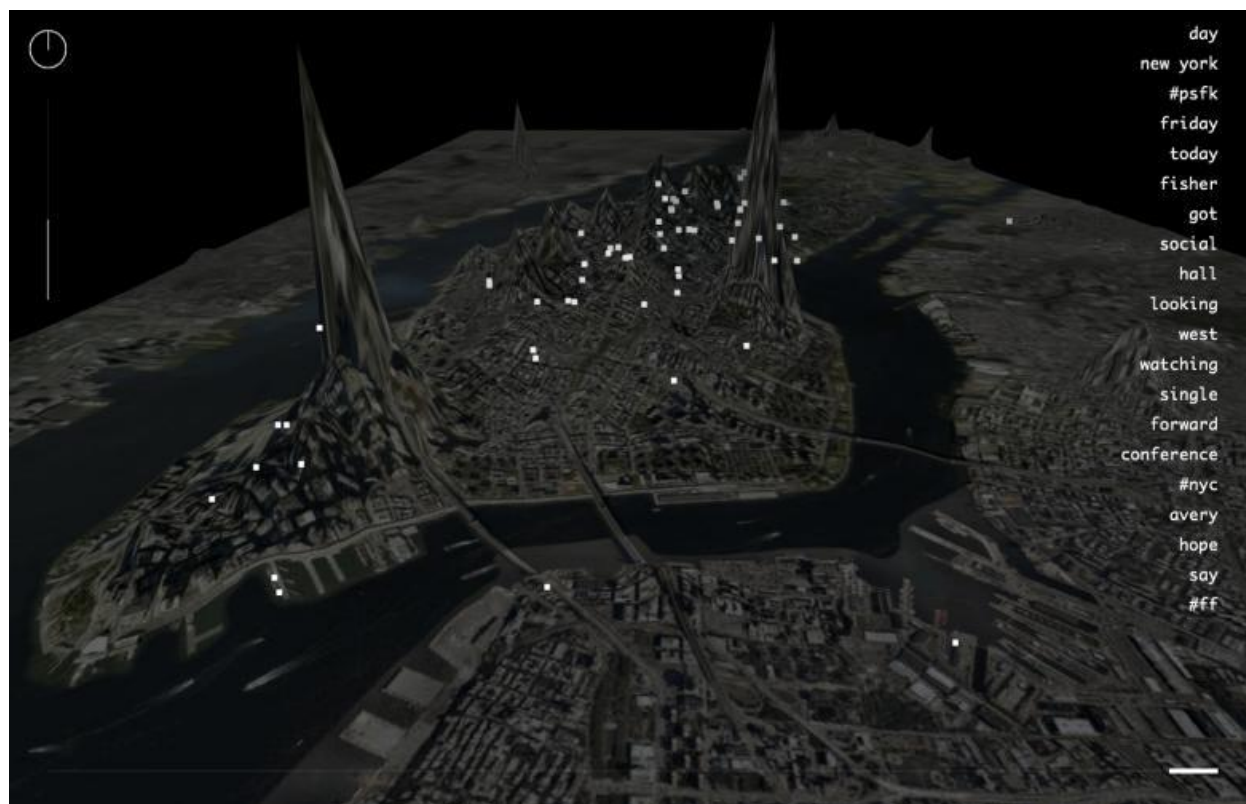


Figure 1. Invisible Cities data captured 13th May 2011. Copyright 2010-11 Christian Marc Schmidt & Liangjie Xia.

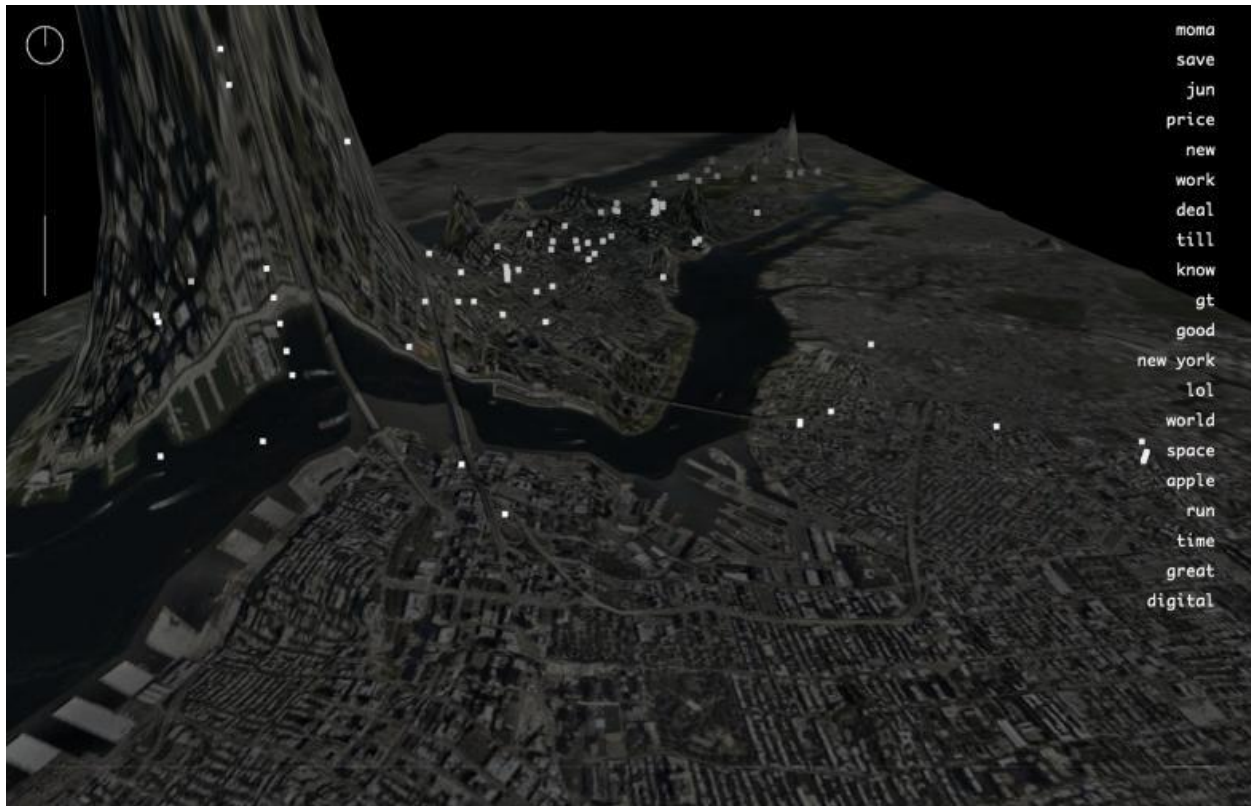


Figure 2. *Invisible Cities* data captured 1st June 2011. Copyright 2010-11 Christian Marc Schmidt & Liangjie Xia.

"Cities are comprised of complex social networks. In addition to the physical architecture these networks define our experience of the urban environment." _Schmidt & Xia 2011

As many have written, to walk the streets of the city or town is now to walk the streets whilst being connected. The ubiquity of the mobile phone, and the increasing use of smartphones in particular are seemingly 'always on', connecting to data networks often combined with GPS and allowing for locations to be tracked and defined. But what happens to this location data and how are users shaping various landscapes through the use of geo-located information such as tweets, check-ins and embedded photography?

Eric Gordon writes of "network locality" defined as "the experience of interacting with located data within the perceived infinity of global access" (Gordon 2009, p. 22). It is through these networks that we, as users, are frequently able to locate ourselves, our actions, our places and our thoughts through a variety of media applications and technologies. The smartphone, alongside the ease and open access nature of digital mapping systems such as Google Maps and Open Street Maps, has seen an increase in how and when people now choose to locate their activities. Photographs can be geo-located, capturing places frozen in time. We can check-in to virtual equivalents of shops, work buildings, or our own homes with applications such as *FourSquare* and *Gowalla*. Each of these instances is only possible through an

underlying network of global connections. However, it is through this 'global access' that we are now also changing the mapped narrative of many local areas.

The map is more than a means of seeking directions, but allows for a visualisation of data in various formats. Each time people log in to *Foursquare*, *Gowalla* or *Facebook Places* they are locating themselves on a map, they are providing a representation as to the area they are in. Although users cannot see the extended map of data whilst using the application, various mash-ups have been created integrating different APIs with Google Maps as a way of visualising each check-in location in relation to one another. This project will focus on mapped data collected from areas local to the GPS co-ordinates of each data collection. *FourSquare* places, ephemeral geo-located tweets and geotagged photographs will be visualised against a background of a local map. Each area will be defined in terms of a community or town, and will be viewed as an isolated snapshot, depicted as a miniature mapped landscape in amongst the surrounding area.

The project seeks to understand the changing landscape of each local area by analysing what John Pickles (2004) defines as "socio-spatial identities" that he sees to be the basis of many contemporary maps as "digital mapping has begun to influence many more domains of social life" (p. 10). Whereas many location-based applications seek to define the user's position in amongst a global network, this project examines the changing narratives of the local area through numerous check-ins, tweets and images. The changing nature of the map is captured at different points in time as a way of analysing the ephemeral landscape of data depicting the opinions, locations and imagery left as digital memories or tokens by those within the area. The narrative of place takes precedence over the identity of the user as places and spaces are re-examined in light of this user-generated content. It is through looking at these maps that we can start to see how local areas are being shaped by this data.

One such project providing a representation of geo-located Twitter feeds and Twitter trending topics is Christian Marc Schmidt and Liangjie Xia's (2010) project titled *Invisible Cities*[1]. As stated on their website, "Invisible Cities maps information from one realm – online social networks – to another: an immersive, three-dimensional space. In doing so, the piece creates a parallel experience to the physical urban environment" (Schmidt 2010). On loading *Invisible Cities*, the user is presented with a three-dimensional mapping of New York. The underlying map is familiar to those having ever viewed the data from Google Maps or Google Earth, and landmarks such as the Hudson River are viewable as well as the various sections of the city including lower Manhattan and Central Park. Each real-time piece of geo-located data from *Twitter* and *Flickr* changes how the city is represented and viewed. Imaginary spiked hills are constructed, distorting the mapped view of the city, creating a new imaginary space of digital data. As the density of location data changes, so do areas around the city. One day the city may be viewed as in Figure 1, the next day the city is shaped as in Figure 2. This view of the city is now re-arranged through the new layer of location information. As de Souza e Silva states, the city has become a "hybrid space", a "mobile space, created by the constant movement of users who carry portable devices continuously connected to the Internet and to other users" (de Souza e Silva 2006, p. 263). As de Souza e Silva notes, hybrid spaces are not purely augmented spaces, and this is especially true of *Invisible Cities*. There are various layers and combinations of actions taking place in order to create the piece. There is the layer of data provided by users geo-locating the information in the New York area. There is the two-dimensional mapped layer showing areas familiar to both locals and those having viewed New York on various maps and satellite views. Then there is the layer of the map and the data combined to form the resultant viewpoint, manipulating the local view in real time to provide yet another perspective. An augmentation would see these spaces as separate, leaving the map in tact and adding an extra layer of data on top. However, in this instance the map becomes a hybrid of user and place shaping the city and creating

rhythms of movement over a period of time. The user cannot see these distortions as they themselves walk the city streets, but it is through their actions that others can view the landscape in a different way. Here the narrative of the city exists in peaks and flows through the changing visualisation. As Christian Marc Schmidt and Liangjie Xia (2011) note in discussing *Invisible Cities*, the work depicts a "new kind of geography in which the urban landscape is reframed through narrative (a sequence of events in space and time)." Maps are no longer static and fixed. The growing trend of geo-location constantly seeks to change the map creating temporal-spatial narratives that change depending on the moment they are viewed. It is these narratives of place that I wish to explore further through mash-ups such as *Fourwhere*.

In examining my local area I can access *Foursquare* check-ins of nearby shops, takeaways and conveniences as well as view the tweets of strangers around me. These views differ to my own relationship with the area, the shops that I visit frequently in person, the people I may or may not see. A five minute walk from my home there is a parade of shops. They exist in a line, one next to the other. However, the view on *Fourwhere* is quite different. *Fourwhere* is a mash-up of *Foursquare* data plotted on Google Maps. You can search any area and find foursquare locations that are mapped around that immediate area. As with any Google Map you can zoom in and out to make the search area broad or narrow, but the application generally works more effectively on a local level. When zooming into the street by street level of my local area I am able to locate the shops. Not every shop is added on Foursquare therefore only shows a snapshot of what local people and businesses decide are relevant to the area. Much like *Invisible Cities*, *Fourwhere* provides a layer into the geo-located world of users in the local vicinity. The density of shops in the local area have not been replicated within *Foursquare*. Instead, only a handful of shops are displayed when trying to check-in on the application. Most notable are the supermarkets and takeaways that appear, potentially hoping for users to get 'specials' (such as discounts for the mayor, etc). Smaller stores such as the optometrists and travel agent are not found as check-ins (as of the 19th May 2011). This may be due to the fact that these two stores take up the same amount of street space as one full sized store, and/or are less frequented by users of the application.

This is where the user becomes noticeable within the mapping of data. It is only through companies or individuals adding themselves to the *Foursquare* database that they then appear as check-ins. If local users/businesses do not feel the need to create these places they are then left off the mapped database. In terms of viewing the spatiality of the *Fourwhere* map, these places no longer exist within the layer of my locality. Certain places take preference within this new map of my area. The map can be added to and grow over time as more check-ins are established but it acts as a separate representation, a local area frequented by those connecting online. This layer of check-ins can change the identity of the area when viewed against other representations of the local area. Place names can be misspelt, such as one local bakery being named a 'balery' (as shown in Figure 3). This adds a layer of almost fiction to the area. The misspelling changes the place into something new that only exists within the layer of the geo-located machine data. I can access the 'balery' online but in real life it will be known by its correct name. It is through the creation of the user's own places that there are multiple 'homes' in my local area. Places are created and called 'home', yet this is a place name that only means something to the creator. They are not my home (although I can virtually visit and check-in to it) and one of the homes is not the same as the other home created by another user. The geo-located network allows for multiple identities and in doing so the layer also allows for multiple entries creating numerous overlappings of different (or sometimes even the same) real life places. It is through this ability to create places that we can also see the opposite trend occurring in local areas. Although places have networked access and data streams, it does not mean that it will be inundated with Foursquare check-ins and geo-located twitter feeds.

As de Souza e Silva (2006) writes, it is "not possible to define a worldwide cell phone culture, because cell phone use differs substantially from place to place depending on cultural and socioeconomic factors." Therefore, some places end up existing free from this layer of digital locative urban commentary. On a recent trip to the Sierra Nevada mountains in Spain I found limited foursquare check-ins. I stayed in the town of Bérchules with access to a free wi-fi network in the apartment and generally good access to a mobile phone data connection. However, the people of Bérchules (even though they are connected, and some have smartphone access) choose not to check-in to their daily activities. Location is based around adding hotels and bars that tourists may want to visit on their travels. Location is also very much often limited to whole places rather than separating those places into various shops, cafes, etc. When logging in to *Foursquare*, the town itself was a place and existed as one mapped area (until I decided to add the place I was staying in). In many ways the layer of check-ins within this vicinity switches to a purely tourist view of the area and everyday usage fades away. Yi Fu Tuan's notion of "place" becomes "space" as the familiarity of these locations is not always known in detail to passers-by. Tuan notes that "when space feels thoroughly familiar to us, it has become place" (1977 p. 73). Therefore, tourists may not frequent the local shops on a daily basis, and the locals that do, do not see the need to leave a digital trace of their everyday occurrences. People passing through may often leave their own mark such as the restaurants or hotels they have been to in amongst the places they visit, but these now exist as mementos of an experience, rather than a constantly viewed place linked to everyday life within that space. There is no need for every building to be 'placed' and instead the whole village becomes placed in amongst the wider area, not succumbing to the finer detail of dozens of check-ins within the local vicinity.

Unlike the hustle and bustle of a large city such as New York, this absence of geo-located data reveals a slower pace of life, as the rhythms of the city are found within the quotidian streets and not through mash-ups of location-based data. The layer of location within the local area does not change as frequently, producing a different type of spatial-temporal narrative played out in a new way. As this project has shown, geo-location is more than locating objects, tweets and places. It is a way of creating various layers of information about an area. Mash-ups, maps and applications all reveal piece of a place, sometimes joining to show the ever-changing nature of how that place is experienced. Yet for those only able to experience the digitally mapped representation, this data offers a window into a partial place, revealed only to/by those choosing to leave their mark and create another layer to be viewed by others accessing the network.

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MATERIAL MATTERS: MACHINE AGENCY AND PERFORMATIVITY

Petra Gemeinboeck & Rob Saunders

This paper explores new forms of entanglement between human and nonhuman agents. In considering the performative potential of intelligent machine agents, we are interested in shifting the focus from representational issues to questions of agency and materiality. The investigation revolves around the authors' robotic installation "Zwischenräume".



Fig.1. Zwischenräume, robotic installation, robococo (Petra Gemeinboeck & Rob Saunders) © robococo



Fig. 2. Zwischenräume, robococo: two weeks into the exhibition © robococo

In early Artificial Intelligence approaches, robots sensed their environment, built complete internal models using the sensed data, constructed plans based on those models, and acted to execute their plans. Even though they acted in the world, the world they ‘conceived’ and acted upon was a separate, disembodied reality. Contemporary approaches, in contrast, aim for intelligence that emerges from interacting with the world, thus emphasizing situatedness and embodiment (Brooks 1991, Harvey 2000). The agencies performed by these ‘intelligent’ machines evolve based on the dynamics of their material context. It is only when robotic agents are coupled with an environment, that, according to Beers, their potential to act is realized through the agent’s behaviour in that environment (1995). This is a starting point for considering ecologies that entangle human and nonhuman agents through embodied experience of a shared environment. From a posthuman point of view, embodiment is always contextual and specific; agency is materially enacted and distributed across bodies, rather than located within (see Hayles 1999, Barad 2003, Bennett 2010). Without disregarding their differences, both human and nonhuman agents adapt and know not by observing from the outside, but because they act as part of the world (Barad 2003).

This paper explores new forms of entanglement between agents, human and nonhuman, and probes into their performative potential. Our investigation seeks to set up a conversation between disciplines by looking at the potential of machine agency through the lens of materialist performativity. The notion of the performative here refers to the productive and, at the same time, destabilizing enactment of agency as agents engage with their environment. In considering the performative potential of intelligent

machine agents, we are interested in shifting the focus from representational issues to questions of agency and materiality. First, we will discuss embodiment and agency as they are applied in the Dynamical Systems approach to robotics and conceptualized in feminist materialism. The investigation of how, together, these two can open up a third lens through which to look at the performative potential of machine agency will revolve around the authors' interdisciplinary robotic practice and their work *Zwischenräume*: a machine-augmented performance environment, which embeds a group of autonomous robots into the architectural fabric of our environment.

The Dynamical Systems view of agency is based on the observation that “animals are endowed with nervous systems whose dynamics are such that, when coupled with the dynamics of their bodies and environments, these animals can engage in the patterns of behavior necessary for their survival” (Beer & Gallagher 1992). Artificial Intelligence inspired by this view degrades intelligence “in favour of the concept of adaptive behaviour” (Harvey 2000). The lived phenomenal experience of knowing-how outplays the information processing of knowing-that. “Treating an agent —creature, human or robot —as a dynamical system coupled with its environment through sensors and motors, inputs and outputs, leads to a metaphor of agents being perturbed in their dynamics through this coupling”. This contrasts the traditional AI approach, according to which agents are “computing appropriate outputs from their inputs” (Harvey 2000). The metaphor resonates with Varela's co-evolution between a system and its environment or another system: both evolve through mutual perturbations, setting off a trajectory of mutual adaptations to compensate for the external perturbances. The two structurally coupled systems “have an interlocked history of structural transformations, selecting each other's trajectories” (Varela, 1979).

As a general formalism the Dynamical Systems' perspective can be applied to computational systems as well as non-cognitive and non-computational physical systems. Its potential to straddle the Cartesian boundaries between mind, body, and the environment (Clark 1998) opens up a path into thinking across human and nonhuman agential capacities.

Looked at from a posthumanist point of view, embodiment “always is contextual, enmeshed within the specifics of place, time, physiology and culture, which together compose enactment” (Hayles 1999). It aligns with Varela's biologist view, where experience comes from having a body that always is embedded in an extensive biological, psychological and cultural context (Varela et al: 1991). Agency is a product of this process of enactment, or ‘enaction’, rather than a ‘virtue’ that can be possessed or programmed. In Karen Barad's performative account, agency is “a matter of intra-acting; it is an enactment, not something that someone or some thing has” (2003). The becoming of agencies and bodies (matter) is mutually entangled—agency is enacted through the dynamic encounter of bodies, while, at the same time, bodies are produced and transformed in this “congealing of agency” (Barad 2003). Similar to the Dynamical Systems view, these material enactments may involve humans or nonhumans, however the materialist feminist perspective challenges not only Cartesian objectivity but unsettles a range of ontological boundaries, deeply ingrained in the Cartesian tradition of modern epistemology, such as human–nonhuman, culture–nature and social–scientific.

“The separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse. Onto-epistem-ology – the study of practices of knowing in being – is probably a better way to think about the kind of understandings that are needed to come to terms with how specific intra-actions matter” (Barad 2003).

Our installation work *Zwischenräume* (Interstitial Spaces) is concerned with the intimate complicities that connect us with the machinic ecologies we create. It develops an unusual concoction of walls, curious robotic agents and surveillance technology to explore the performative potential of the unfolding material pluralogue. The charged terrain of the wall becomes the site for this unusual material encounter, playing out the co-dependant agential relationship between humans, machines and their environment. The installation couples curious robotic agents with our built environment by embedding robots into the architectural skin, sandwiched between the existing wall and a temporary wall that resembles it. Each machine agent is equipped with a motorised hammer, a surveillance camera, and a microphone to interact with its environment and network with the other machines. The hammer is not only used by the robots to pierce holes for the camera eye to see what's going on outside but also for communicating amongst the collective. The walls' and the machines' anatomy intertwine, turning the wall into the machine's brittle skin, and the machine into the wall's kinetic organs. The wall-body is the milieu through which the machines intervene and develop and express their desires through knocking, chipping, and punching holes, and adapting.

The machine-augmented environment embodies the agents in the terrain they survey; they are programmed to be curious and are thus intrinsically motivated to explore and transform their environment. The means of marking and exploring have been adopted from two military references, that of urban combat and visual intelligence. Movements, colours and faces are processed to create an adaptive model of the surrounds that allows the robotic agents to expect learned behaviours and proactively intervene. To these curious machines, learning and adapting are not goal driven but evolve based on what they discover and interpret as 'interesting'. The intrinsic desire to learn about the world directs both the system's gaze and its actions, resulting in a feedback process that increases the complexity of the environment relative to the perceptual abilities of the agent. Literally carving a trace of their curiosity into the wall, their desire to look is acted out in the open and manifests materially. They also communicate their state of arousal physically by re-sculpting their environment, rather than using an electronic network. Equipped with contact microphones to listen into the wall and sense the knocking of other robots, they use different knocking signals to rhythmically express excitement (high levels of sustained interest) or frustration (low levels of interest for a certain period of time). The embodied agents act and adapt through their intra-actions with their surrounds; shaping what they 'desire' to create or perform. At the same time, they become and are stimulated by what they shape.

When shown for the first time (figure 1 and 2), the gallery space was bound by glass walls, requiring us to not only stage the intervention but also the environment to be intervened with. The transparent space was turned inside out to present a private, cosy, living room scene oriented towards the public space outside the gallery. The machinery attached to the temporary walls inside the gallery transformed the living room scene into a capricious voyeur that drastically transformed the space over the course of three weeks. While the implicit theme of surveillance and voyeurism is not the focus of this paper, it is worth noting that the enactment and embodiment of the power of the machinic gaze was at the heart of *Zwischenräume's* conceptual development. Yet while the voyeurism enacted by *Zwischenräume's* robotic actors relies on visual intelligence, the work defies military logic of suspicious behaviour and rather promotes the machines' capability to seek difference for the sake of being different (Gemeinboeck & Saunders 2011). The machines' motivation to seek difference for the sake of difference, rather than for the purpose of othering that which is different, sets the tone for an alternative investigation into the politics of surveillance and its material affect. It isn't as simple as incriminating or trivialising the machine. The mingling of agencies and materialities in our installation and the way in which the audience is implicitly implicated, rather than invited to control the course of events, intimates the heterogeneous nature of surveillance. Thus, it is not the spectacle of the intervening machinery that we are interested

in, but rather the spectacle of the mutual processes this intervention unfolds as it foregrounds the material ecology of this machine augmented environment and its ongoing becoming.

The structural coupling of machinic agents and our built environment politicizes the matter of material agency and aims to foreground the performative potential of Dynamical Systems. Looked at from an expanded, ecological perspective, the work enacts what Jane Bennett describes as “an encounter between ontologically diverse agents, some human, some not, though all are thoroughly material” (2010). *Zwischenräume*’s drama features the encounter of two nonhuman agents, both human-made artefacts, one imbued with (artificial) intelligence and an ability to be proactive and the other designed to be inert and deprived of any vital qualities. We were interested in the co-dependent nature of this assemblage of forces, and the affective relationship through which it evolves. The structural coupling of machine and environment sets in motion their path of material becoming; both evolve through continual adaptations to compensate for the mutual perturbations. The process opens up the transversality of assemblages that owe their agential forces to the vitality of the materialities and dynamic spatio-temporal relations that constitute them (Bennett 2010). It’s a performance that always unfolds in the present, without the comfort of rehearsal. Rather, as Matthew Fuller argues, “the process of becoming that is machinic heterogenesis has no plot, as in story or territory, only a “middle,” an ongoingness: It cannot be turned into a standard object, it must be done” (2005).

The new assemblage not only challenges the structural integrity of the wall but also intervenes into the socio-politics of our third skin, laying open its vulnerabilities to continuous perforation. While perhaps the machine-wall couple seems purely destructive at first, together they unsettle the politics of the wall and turn it into a negotiable playground. Looked at as actors, they have much in common: both are as much technological as they are cultural; each models nature. The dynamical system underlying the first is inspired by the observation of the animal, while the latter renders the cave efficient, mobile, and mass producible. Both are ambiguous with regards to their acting: the machine empowers some and deprives others; the wall includes some and excludes others. Both extend the human: the machine is an extension of both, mind and body, while the wall is our extended skin. And yet, the dynamic agential forces of the machine are much closer to the human. We are more empathetic to, and at the same time, threatened by them. We (Westerners) cannot perceive the vital qualities of the wall, whereas the embedded machines can render it alive. The performativity of the machinic wall is further complicated by the machines’ autonomy; the self-motivated act of destructing the wall, the self-motivated act of looking. This is where it gets uncanny. It’s ok if the machines act on our behalf, and we control the machine that deconstructs the wall or if human governance drives the machine’s eye. Yet intrinsically motivated agents exhibit a higher degree of autonomy than agents motivated by an external human agent. The meaning of agency changes drastically, once the human actor can no longer control the human-machine-environment coupling. The discomfort of this shift, of course, reaffirms the segregation and hierarchisation of these actors. Neither the machines nor the wall exist outside the realm of human culture, and the autonomy of the machine is simply stretching its capacity to extend the human further: its intrinsic motivation, even if artificial and perhaps alien, is still modeled by a human agent, as is the design of its material embodiment.

This stretching quality was exactly what we aimed for with *Zwischenräume*, allowing us to stretch into the environment, to intra-act, not as the isolated and superior human but as part of a bigger assemblage. Coupling autonomously performing agents with our built environment opens up a space for Barad’s ‘congealing of agency’ (2003) where the different agential forces not only co-evolve but potentially conspire and perform together. All actors involved are vital players, entangled in a complicated

web of connections and specificities. While non-anthropomorphic, the material embodiment of the machines' cognitive processes and desires places them in a realm, where we (humans) can share and bodily experience them. The unfolding relationship between audience, machines and other matter, materialises a slice of our machinic ecology and makes tangible our position within.

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DIGITAL ETHOS: TRANSFORMATIONS IN CONTEMPORARY PHOTOGRAPHY AESTHETICS SUBSEQUENT TO COMPUTATIONAL ART

MURAT GERMEN

Digital photography allows artists to think in a more daring and free way. This freedom influences the content, visual aesthetics of artworks in contemporary photography, which is influenced extensively by digital creativity. This paper will focus on the significance of digital technologies in changing aesthetics, planning, vision, fiction, realization of photography and avant-garde photography forms nourished by digital culture



Fig 1. ©Murat Germen, Muta-morphosis #3, Cairo, 2010.



Fig 2. ©Murat Germen, Muta-morphosis #79, Istanbul, 2011.



Fig 3. ©Murat Germen, Muta-morphosis #20, Istanbul, 2010.

INTRODUCTION

Photography is one of the creative fields at which technological advances influence artistic expression the most. The ease of manipulation brought by software and extra features available in cameras made artists using photography reconsider their visions, themes, narration, syntax and ways of sharing their artwork. Sharing sites like Flickr, which expedite encounters of various individuals from different cultures, help in changing the perception of the much vital notion of time and enable artists to get faster feedback, revelation, exposure and layering of information to be conveyed.

While some photographers, who are deeply obsessed with analog processes, deny digital technology; it is quite obvious that artists, who are aware of the complexity and particular advantages that this technology brings, indeed end up with a novel aesthetics of photography. In addition to the regular montage and collage methods remaining from the old analog days, digital imaging techniques allow artists to work with notions like augmented perception, chronophotography, surrealism, pictorialism, superimposition, simplification, creation of new worlds, appropriation...

AUGMENTED PERCEPTION

“Without perception there is no art. A work of art is an organized array of sensory stimuli if, therefore, the senses are not stimulated, then the true work of art does not exist for the observer.” (Wise 19)
 Though there are studies on exceeding human sensory capabilities, our visual perception still takes ‘what the eyes see’ as the basis of apprehension. In this case, artists who intend to go beyond what one can see with the naked eye, take advantage of software. These digital means enable artists to assemble and convey information in a holistic manner that is otherwise not possible to record in a single photographic documentation act. The resulting totality leads to a particular aesthetic form which turns out to be the synthesis of individual forms, in other words a ‘sui generis’ situation. One can interpret this as a cubist approach.

If we consider the present digital platforms we use, various tools of social media on the other hand; “literacy, TV, computer games, the Internet—all play a role in shaping how we think. Technology is never innocent—we develop it and use it, and in turn it shapes us. [...] Technology allows one to have experiences far beyond what are supported by the normal human physiology. Sternberg and Preiss examine the implications of technology on cognition. When technology is broadly conceptualized as ‘the building of artifacts or procedures-tools-to help people accomplish their goals,’ then the influence of technology on human development is as old as humanity. [...] At the very least, it is becoming increasingly obvious that technology is altering mental functions (Sternberg & Preiss, 2005).” (Gackenbach 346)

This alteration takes us to the notion of cyberception which is, after Roy Ascott, “the emergent human faculty of technologically augmented cognition and perception.” Cyberception carries the potential of laying a firm basis for the development of higher states of consciousness, i.e. augmented perception. This is why the congruence between computational and human behavior appeals to the artist and helps in augmenting his/her intuitive gift to generate aesthetic form. Andreas Gursky, one of the leading photographers of the much respected Düsseldorf photography school of Bernd & Hilla Becher, Chris Jordan of USA and French photographer Jean-François Rauzier take advantage of digital imaging and post-processing in order to take his work to a level that cannot be realized otherwise.

PICTORIALIST TENDENCIES

There is a never-ending relationship between photography and painting. When photography was invented, it took painting’s function of recording history and was more trusted as a documentary tool since it witnessed experiences more realistically than paintings, which are actually constructs from scratch. Later photography proved its independence and stopped being seen as pure evidence. This is when it found the opportunity to act like painting and be taken as an apparatus of fiction. This new relationship gave birth to ‘pictorial’ photos that emulated optical qualities of paintings, which in turn paved the path to hyper-realistic paintings that are easily mistaken for photos.

If we look at the early stages of this relationship; “by the last quarter of the 19th century, photographers around the world had supplied ample proof of the camera's unique ability to record people and places. At the same time, there were others who were taking pictures for a different purpose. Convinced that the camera could be used to go beyond simply recording what was in front of the lens, these photographers, both amateur and professional, were determined to produce images of artistic merit. [...] Their aim was to convince art critics, other photographers, and the general public that photography should be regarded as a legitimate form of art. [...] At the time, people regarded the world's great paintings as the highest form of visual art. It was only natural that artistic photographers began by trying to produce the same kinds of images as those created by the greatest artists. They chose the same types of themes, settings, and compositions. Like painters, they emphasized the contrasts between dark and light tones (called *chiaroscuro*). [...] Perhaps the most distinguishing characteristic of this early artistic movement was the way in which many photographers manipulated their images.” (Sandler 57) Henry Peach Robinson's book ‘*Pictorial Effect in Photography*,’ published in 1869; referred to this movement, influenced by the ‘photography-as-art’ approach, as *pictorialism*.

The intimate connection between painting and photography is still so strong that many contemporary photographers like Helena Blomqvist (Swedish), Désirée Dolron, Jasper de Beijer (Dutch), Christian Nolf (Belgian), Yao Lu, Lu Jun (Chinese), Nazif Topçuoğlu (Turkish), Alessandro Bavari (Italian) are taking advantage of the digital imaging technologies in order to create photos that resemble paintings. “Peter Bunnell, in his work titled ‘*A Photographic Vision: Pictorial Photography 1889-1923*’ (1980), associates the antiphotographic art photography known as ‘*pictorialism*’ with a reaction against ‘the dehumanizing effects of science and applied technology.’ *Pictorialism*, he adds, placed ‘its greatest emphasis on the individuality of the artist as witnessed in the work of art and idiosyncrasies of its production.’ ” (Sternberger 37)

PALIMPSEST-LIKE SUPERIMPOSITION: LAYERING TRANSPARENCIES

A palimpsest (Greek “*palin*,” again; “*psēstos*,” scraped) is a re-used papyrus or parchment manuscript in which the original text has been washed or scraped off and a new one substituted. The modern version of this archaic surface of knowledge which allows accumulation of information is the Photoshop canvas, where you can completely cover a layer behind yet still make some details emerge from beneath. This possibility of layering various data from different sources one on plane is a more complex form of the good old analog collaging & montaging methods and enables artists to reach a richer expression through superimposed pluralities.

German artists Elger Esser, Kay Kaul and Michael Najjar, Turkish artists Murat Durusoy and Zeynep Kayan are among numerous photographers who benefit from superimposition, in which various images become interwoven into a reassembled complex fictive entity as a collage that brings memories and places together in one plane.

INCLUSION OF TIME AS A NARRATIVE TOOL

Period(s) included in single photographs are usually and naturally much shorter than periods documented in video works. Yet, when it comes to combining photos taken at different times on one photographic surface, it becomes possible to see remnants of longer periods of time. Performing time lapse photography and compositing images as a durational pattern of many traces left by different moments,

lead to the positive notion of timelessness (lack of time dependence) due to the plural presences of time at once. Substance becomes multi-layered and hierarchy disappears: All elements are relatively equal parts to the whole.

An accumulated photographic rendering of one place with various lights, movements, figures, facets, objects and subjects coming from discrete slices of time, allows a richer visual definition of the particular milieu that can be a more faithful description of the observer's personal experiences. The resulting images after such accumulations are usually visual experiences impossible to the naked eye.

Ahmet Elhan of Turkey, Pablo Zuleta Zahr of Chile and Thomas Weinberger of Germany are some artists who manipulate the perception of time by incorporating distinct phases of moments purposefully selected from the chronological continuum.

SIMPLIFICATION AS AN ELUCIDATION TOOL

Even though the presence of the traces from different times can help artists to improve their expression, it is also possible to take a completely opposite direction and take information out from a single layer of time. This subtractive approach limits duration to an even smaller fraction of time, to the degree it does not exist. The lack of detail is not meant to hide information from the audience, but rather to enlighten artistic expression and make viewers focus on a particular content more easily. Following Mies van Der Rohe's famous quote; "[sometimes] less is more..."

Above mentioned simplification can be obtained by erasing the signs of specificity and turning it into anonymity, potentially pointing to the banality of our homogenized environments. An alternative way is to remove the traces of typical presence in order to create a disturbing sense of absence where existence and attendance are normally expected. These exclusions of native details from recorded reality that may lead to floating components that are isolated from their contexts, challenges our view of the reliability of photography and our concept of the space represented by it. Jesper Rasmussen (Danish), Josef Schulz (German), Matt Siber (American) are artists who use simplification in order to clarify what they want to convey through their photographs.

THE ANTI-REAL: SURREALISM IN PHOTOGRAPHY

Photography for some, is reflection of reality. Yet, the illusion of a single reality, is criticized by W. Flusser: "The [observer] trusts [technical images] as he trusts his own eyes. If he criticizes them at all, he does so not as a critique of image, but as a critique of vision; his critique is not concerned with their production, but with the world 'as seen through' them. Such a lack of critical attitude towards technical images is dangerous in a situation where these images are about to displace texts. [It] is dangerous because the 'objectivity' of the technical image is a delusion. They are, in truth, images, and as such, they are symbolical..." (Flusser 2000) Some artists take this critical attitude to an extreme to defy Reality and create a new synthetic reality.

Quoting the Wikipedia definition, "surrealist works feature the element of surprise, unexpected juxtapositions. [...] Surrealism would advocate the idea that ordinary and depictive expressions are vital and important, but that the sense of their arrangement must be open to the full range of imagination. [...]"

Freud's work with free association, dream analysis and the hidden unconscious was of the utmost importance to the Surrealists in developing methods to liberate imagination." Artists using digital techniques to take photography from realism to surrealism, aim to free people from false rationality, restrictive customs / structures and prejudice.

Ryuta Amae (Japanese), Michael Najjar, Loretta Lux (German), AES+F (Russian), Anthony Goicolea (American), Ruud van Empel (Dutch) are among artists who produce startling, otherworldly surreal images which involve composite elements culled from different settings, figures, cultures, individuals and combine them into new topographies, characters and scenarios.

APPROPRIATION

The complex notion of appropriation is straightforwardly defined by Mikhail Bakhtin: "The word in language is half someone else's. It becomes one's own only when the speaker populates it with his own intention, his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention. Prior to this moment of appropriation, the word does not exist in a neutral and impersonal language, but rather exists in other people's mouths, in other people's contexts, serving other people's intentions: it is from there that one must take the word, and make it one's own." (Bakhtin 1981:294)

Art is such a field that one can easily borrow an idea, artwork, approach and use it/them in his/her work, with the condition of quoting the reference in ideal conditions. Very famous works like "Las Meninas" by Diego Velázquez have been reinterpreted in the form of "hommage à ..." by very famous artists like Pablo Picasso and Joel Peter Witkin. In photography, people like Thomas Ruff buy the copyrights of old photos taken by another photographer and retouch them in Photoshop, color them partially and finally transform them into their own artworks. In a recent series called 'JPEGs' (2004-9) Ruff uses readymade JPEGs by exploiting the lossy compression of visual data into spoiled artifacts. Ruff blows low quality low-res files up in order to reveal how much information is lost already before images are served to people and become iconic in world history. These images, blurred due to extreme up-scaling, are somewhere between legibility - illegibility and point to the skepticism that people should adopt against images that are supposed to convey actualities of world news.

CONCLUSION: CREATION OF A NEW WORLD

Mark Kingwell asserts that "photographs are not multiple depictions of some single reality, waiting out there to be cornered and cropped, and somehow regulating, even in the cornering and cropping, how / what the image means. Rather, photographs offer multiple meanings. The presented image is not a reflection, or even an interpretation, of singular reality. It is, instead, the creation of a world." (Kingwell 2006)

Truth with the capital T is not taken as the departure point in this paper; on the contrary, personal delinuations of temporary yet experienced smaller realities is suggested. Digital tools available for photography allow the artists in the field to think in a more daring and free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Photography is probably one of the visual art platforms that is influenced the most

by digital production and creativity. Fortunately, it seems it will continue to be so in the future and digital means will strengthen photography's position in the art world as one of the most progressive expression platforms.

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DIGITAL PHOTOGRAPHY: EXPANDED CREATIVITY AND TECHNOLOGY

Murat German



Digital tools available for photography allow artists to think in a more daring, free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Digital means/processes are already and will in the future, strengthen photography's position in the art scene as one of the most progressive artistic expression and visual language platforms.



Photography is one of the creative fields in which technological advances influence artistic expression the most. The ease of manipulation brought by software and extra features available in cameras made artists (using photography as an articulation tool) reconsider their visions, themes, narration, syntax and ways of sharing their artwork. Sharing sites like Flickr, which expedite encounters of various individuals from different cultures, help in changing the perception of the vital notion of time and enable artists to get faster feedback.

Digital tools allow photographically based artists to think in a more daring and free way. In addition to the regular montage and collage methods remaining from the analog days, digital imaging techniques allow artists to work with notions of augmented perception, chronophotography, subreal encounters, pictorialism, palimpsest-like superimposition, interlacing, simplification / minimization, creation of new worlds, delusion, synthetic realism / artificiality, appropriation.

Following textual content are excerpts from the concept statements of various artwork series in which computational procedures were essential in their creation.

Aesthetics of serendipity: Muta-morphosis

The different traces left by various people and slices of time co-exist as layers in cities that have a particular past. The global trends and economical conditions strain this multi-layered traditional urban structure. An architecture with a language that cannot be considered as local anymore but universal, attacks the old texture of cities during the urban growth. This intervention usually implemented through gentrification supported by big capital, causes the urban tissue and its components to face mutation and even

beyond this, undergo metamorphosis. Following this interaction and consecutive natural selection, some constituents disappear and some survive after being transformed.

The concept of “muta-morphosis”, a combination of the notions of mutation and metamorphosis, and the connected artwork series was obtained by reducing panoramic images on one axis. The image compression on the horizontal level points to the dynamics between the urban components that can persist and the ones that give up, vanish in the various historical, residential and business urban districts. The visual urban result obtained after this contraction process points to the much discussed notion of evolution, where stronger components of existence survive the others after a natural selection process and change the course of life. The lack of a single perspectival structure due to multiplicity of perspectives after panoramic imaging, can be linked to Ottoman miniatures, which in turn, connects the global contemporary representation to its local traditional counterpart.

Contemporary aesthetics is a subject under construction due to the rich variety of fresh expressive means supported by the computational creativity, nourished by artistic spontaneity and improvisation. The series ‘Muta-morphosis’ could only be created within the digital realm, and it indirectly points to the mutation and metamorphosis in aesthetics in general.

Photography as a tool of Alienation: ‘Aura’ series

Regular photographic imaging record volumetric planes with smooth surfaces. The reason is the camera’s deficiency in perceiving and documenting the visual richness of “persuasive” details in life. HDR imaging methods used in creating this artwork series titled “Aura” helped making invisible organism-like textures emerge and point to the notions of decay and symbiosis.

The ‘Aura’ series consists of photo-composites obtained with the combination of Photoshop and Photomatix Pro in order to perform HDR imaging. Four or more photos from the same angle are used for each of the plates from the series. All multiple-photo groups, recorded inanimate objects still, yet animate subjects in different positions / movements due to passage of time and slow shutter speeds. Superimposition of four photos resulted with the particular aesthetics of the constant appearance of immobile objects and the dynamic intricacy as a consequence of layered mobile subjects. The aim in multiplying the photographic renderings of these mobile subjects, is to reach a similar complicated result to the above mentioned notion of merging reflective analogue visual data with its reflexive digital one.

This series of artworks, focusing on the difference between the intrinsic soul and extrinsic perception subsidiary to conditions; was created in galleries, museums and market places in Paris, Bologna, Hong Kong, London and Istanbul in year 2009. The work is conceived as a reminder and critique of the ever-present but recently much-peaked “market economy” climate and approach, concealed with various awareness arguments in artists’ statements. In the presence of commercial art milieu, it seems there has not remained much difference between art venues and shopping malls. Aura series can be taken as a study created after the desire of having artworks independent of peripheral conditions and gaining their inherent value...

Inadvertent Art - Ars Accidental

Even though art is the product of an intentional act of fabrication, the serendipitous spill of an ink or paint, the unforeseen slip of a pen or brush, sudden shake of a camera in the analog realm have the potential of generating an unconscious lead in the planned course of action. The consequential shift in direction may completely change the aesthetics and content of an artwork. An artist should always be open to such 'accidental' dimension which will help him / her to take the original idea out of its initial framework and recontextualize it for a new conception.

The outcomes of software 'failures' in digital technology made a similar type of aesthetics emerge: Glitch aesthetics. The 'dirty' and sometimes 'chaotic' nature of glitches made things look much more organic and human, as opposed to mechanically computerized. This unrefined aesthetics has recently become so popular among designers that some of them have made specific websites as tributes to the process.

Though the accidental dimension in art looks more compatible with analog practices, there are various instances it finds its niche in the digital world as well. Mystifying benefits like freedom from preconceptions, momentary skepticism about planned course of action, avoiding mechanical thinking / prejudices, reaching a more natural / authentic result, discovering unusual and unique aesthetical domains, etc. will always make 'ars accidentalis' an indispensable part of art practice.

Conclusion

Digital tools available for photography allow the artists in the field to think in a more daring and free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Photography is probably one of the visual art platforms that is influenced the most by digital production and creativity. Digital means/processes are already and will in the future, strengthen photography's position in the art scene as one of the most progressive artistic expression and visual language platforms.

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PERIPATO TELEMATIKOS

Greg Giannis

Peripato Telematikos explores walking performances as a means to (re)present our environs, challenging what we know about the places/spaces we inhabit and our relationship with them, and provides a means by which audiences can engage with these performances in real time.

All texts are available online at <http://www.peripato.net> I have included the cartography text for this paper.

Cartography

New technologies have the ability to create highly accurate representations of our physical surroundings but they also present us with the opportunity to express location outside of standardised forms and re-instill subjective articulations of space. Harvey quoted in (Ota 2008)

This project creates subjective mappings through collective and individual staged walks. The mappings are generated in real-time and consist entirely of media that the walker submits through their mobile recording device. As the intent is to create mappings, I was interested to know the cartographic discipline's current thinking on mapping and it seemed remiss to not take this into consideration. The research revealed a crisis in this discipline. The open access to satellite imagery merged with electronic databases is superseding conventional maps.

In his recent chronicle, *The Mapmakers*, John Noble Wilford notes that digital technology has brought about a revolution in the way maps are created and used that is without precedent since the Renaissance. [... M]apping technology has split the interface from the database, a split comparable to the liberating effect photography had on the development of painting. Before the advent of aerial photography, satellite tracking and computerized data-gathering, a map was expected to represent its territory with comprehensive accuracy. Freed of that responsibility, cartographers can manipulate their data into any number of visual representations - an act so potent it has attracted the attention of other disciplines. As Harley remarked, 'Maps are too important to be left to cartographers alone' (Abrams and Hall 2006) p 12.

Mapping has attracted the attention of the art world, which has been a fertile ground for experimentation with maps, and this has come to the attention of the cartographic discipline. There is so much activity in this area that Woods has remarked:

[T]here is a cresting wave, and it awaits skilled surfers (Cosgrove 2006)

This is a quote from a 2006 special issues of *Cartographic Perspectives* (the journal of the North American Cartographic Information Society) on art and maps. The special issue gives a good summary of the current intersections of art and maps and notes its prevalence, but itself also signifies the importance of the work being conducted in these intersecting fields. At the end of this section, I provide examples of artists working with maps.

The art world's response addresses some of the contemporary concerns surrounding maps and their use. The cartographic community itself, as mentioned previously, is leading a call for experimentation in the visual forms of maps, given that it is now freed of the responsibility to represent space with accuracy. Furthermore, the cartographic community is acknowledging the inherent subjectivity of maps and, given that accurate representation of space is now accomplished by satellite imagery, is looking to rein-still subjective articulations of space. Historically maps purported to be objective, but their subjectivity is now well understood, and they have served to support imperialist expansion and other forms of control.

As an instance of the 'microphysics of power', the imposition of rational order upon space is 'the minuscule and ubiquitously reproduced move of 'gridding' (quadriller) a visible space in such a way as to make its occupants available for observation and 'information' de Certeau quoted in (Stott 2005)

In response to this controlling view of the world from above, mappings are being constructed from the perspective of the person on the street. This raises the possibility of mappings that are created by many, from a multiplicity of viewpoints, and not by a single, overarching authority. This controlling view from above has been facilitated by the striation of the earth's surface using a grid of lines of longitude and latitude, an inseparable component of maps. This grid is encapsulated in the contemporary world by the GPS system, referred to by some commentators as the 'Imperial grid' (Holmes 2004). In *Parables for the Virtual*, Massumi argues that if one reduces the systems of meaning to positions on a grid, one denies the very variation and transition inherent to those systems of meaning. The GPS system is one of many technologies that have radically changed contemporary western society, allowing anyone to pin point their position, or the position of others, on the earth's surface with considerable accuracy. But modern technologies raise other issues for mapmakers. We live in a world characterised by 'speed, fluidity and ephemerality of contemporary means of transport, communication and media technologies' (Stott 2005). How are these factors to be accounted for in maps of the contemporary world? How can a map incorporate time? How can we free ourselves from the imperial grid?

CONCERNS OF CARTOGRAPHIC DISCIPLINE.

As mentioned previously, the cartographic discipline is in crisis. Its role in providing accurate maps has been superseded by satellite imagery combined with online databases. Their response has been to encourage a subjective, socially inclusive cartography, to bring to the fore that which has thus far been omitted from maps, to encourage experimentation with map forms given their emancipation from having to provide accurate representations, and to explore possibilities for mapping to represent a fluid, ephemeral, dynamic world; what static representations are unable to do. As noted by Lippard, this response is not entirely new, and perhaps those that led this call in the sixties, did so in anticipation of the current problems with cartography.

The mapmaking process can also bring together disparate elements in a community. In the sixties, geographer William Bunge proposed a 'Society for Human Exploration' that would map from different human viewpoints, including children's. [...] Local people would lead expeditions to create 'oughtness maps,' whose goals were to change rather than merely map the world. (Lippard 1997) p79

This opens the way for maps to articulate a subjectivity missing from maps from the:

time of the Renaissance as new objectivity and functionality began to enter map making techniques leading to the standard of map we have today — 'maps stripped of all elements of fantasy and religious

belief, as well as any sign of the experiences involved in their production had become abstract and strictly functional systems for the factual ordering of phenomena in space.' (Ota 2008) p361-362

In contrast to the maps we have today, this project's mappings are totally constructed of the experiences involved in their production (i.e. staged walks), and make no attempt to factually order space. I proposed a subverting of the map, by creating a (re)presentation from the view point of ground level; a montage of media fragments. This builds on de Certeau's proposal that place is defined by urban planning but transformed into a space through the act of walking:

space is composed of intersections of mobile elements. It is in a sense actuated by the ensemble of movements deployed within it. [...] In short, space is a practised place. (de Certeau 1984) p117

The mappings are constructed totally by media that the walker submits through their mobile recording device. Not the 'voyeur' who is 'at a distance' and thus 'a solar Eye, looking down like a god' who 'must disentangle himself from the murky intertwining of daily behaviours and make himself alien to them'. (de Certeau 1984) p92-93 The walker makes no pretence to mapping a totality, objectivity, or ordering space. Her intervention is one that is very localised and amongst the 'murky intertwining of daily behaviours.' This raises the possibility for mappings to articulate knowledge that isn't solely about ordering space, but a multiplicity of concerns. For example:

MILK [a project by Ieva Auzina and Esther Polak traced the path of milk from its origins in the udder of a cow in rural Latvia to a cheese vendor in the Netherlands] suggests a powerful vision of how locative technologies could allow one to more fully understand how products are commodified and distributed through the actions of global trade, thereby making visible the networked society. ... [W]hen tied to a materialist vision, the recent turn to maps is among the strongest critiques of globalization available to us. Recognizing this, philosopher Alain Badiou referred to the maps of power drawn by artist Mark Lombardi as 'the creation of a new possibility of art and a new vision of the world. (Tuters and Varnelis 2006).

Here we have two very divergent manifestations of mapping. MILK provides a glimpse of the networked society through tracing the path of a basic food product, whilst the maps drawn by Lombardi visualise the networks of power, corporations and the military.

Perhaps the biggest of all challenges is to map '[t]he complexities of the contemporary world – those of financial markets, information networks, social relations, etc. – [that] are said to be 'unfigurable', opaque and unrepresentable.' The map 'must account for the speed, fluidity and ephemerality of contemporary means of transport, communication and media technologies.' (Stott 2005) How can a map be dynamic? Any representation that is static is fixed in time, and represents a snapshot of its subject at a particular point in time. In order to incorporate time, the medium itself must have this faculty. Paper is out of the question (for the moment at least) whereas networked media such as the Internet is the most suitable candidate.

The mappings produced for this project are accessed on the Internet. The constituent components are stored in an online database, and are extracted from the database and presented in ZUI, whenever a mapping is viewed. As is the case with satellite maps, the interface is split from the database. The interface serves all mappings, each differentiated by the constituent components that together comprise that mapping. The constituent components are added to the database over time, and can continue to be

so indefinitely. Unlike static representations these mapping can change over time, opening up the possibility to represent the 'unrepresentable' complexities of the contemporary world.

As mentioned previously, this project's mappings are implemented in such a way as to allow unrestricted manipulation of the constituent components so that the mappings are mutable. All uploaded elements are available for further manipulation. Their position (x, y and z-planes) in the interface is variable. Visitors to the site are able to move these elements and create associations between elements and group others. As a result, the mappings are not fixed in time or spatially. All the constituent components can be added over time and subsequently moved in relation to one another, further complicating the idea of a 'map', but coming closer to the Deleuzian notion of a map:

Make a map, not a tracing.... What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. The map does not reproduce... it constructs.... The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group, or social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation. (Deleuze and Guattari [1980] 1987) p12

The tracing that Deleuze refers to is what we have come to know as the base map. It represents extant knowledge and therefore proposes nothing new, simply a reiteration of existing ideas. The base map has also been dispensed with in this project's mappings. If we are to accept that current mappings represent a Cartesian and static notion of space (Sant 2006) p 99 then to simply take an existing map and overlay it with subjective content only reinforces this. We are still dealing with the same base map, with all its inherent problems, the only difference being that it is now annotated with subjective information:

Current collaborative mapping projects using locative media technologies have often overlooked the conventions of the base map as a site for reinvention. Although these projects are ambitious in their aim to propose alternative organizations of urban space through the way it is digitally mapped, they remain bounded by datasets that reinforce a Cartesian and static notion of urban space.

[...]

Although many collaborative mapping projects undermine their own base maps by layering them with collectively defined concepts of space; including participants' emotions, itineraries and memories, these annotations are inextricably linked to the predefined foundations of the map they overlay. (Sant 2006) p 99-100

In some instances, the mappings serve to embed media into place. Subsequent visitors to these sites, with the correct equipment, are then able to retrieve the media left by the mappers:

Geograffiti (CN/UK) and GeoNotes (SE) ... seek not to document or interpret the environment but to embellish it with digital graffiti or virtual tagging as expressive mark. (Hemment 2004)

This has obvious applications for audio-guided tours, which is already widespread. Outside of the media art world, artists work with maps in ways that are less reliant on the base map, many dispensing with it altogether. Casey's *Earth Mapping* gives many examples.

Aside from reinforcing a Cartesian and static notion of space, the base map, with its reliance on the grid, can be seen to be reinforcing a static notion of thought:

When we think of space as 'extensive,' as being measurable, divisible, and composed of points plotting possible positions that objects may occupy, we are stopping the world in thought. We are thinking away its dynamic unity, the continuity of its movements. We are looking at only one dimension of reality. (Massumi 2002) p 6

For Massumi, this reliance on the grid represents a far greater problem as it stifles the potential for change and looks at the world in a way that restricts possibilities.

ART AND MAPPING

Artists are harking back to the premodern, subjective map that 'concentrated on geographical meanings' and offered 'as full an impression as possible of the lived texture of the local landscape'. (Lippard 1997) p 81

Jameson concludes that 'the political form of postmodernism, if there is any, will have as its vocation the invention and projection of a global cognitive mapping, on a social as well as a spatial scale.'

[...]

There would be virtually no end to a list of every artist, literary critic, critical theorist, art historian, sociologist, or philosopher who globally or locally 'maps out' the contemporary cultural landscape. (Bosteels 1996, p 110)

- *Earth Mapping* (Casey 2005)
- Guillermo Gomez-Peña - placed South America at the top of a map (Lippard 1997) p 80
- Peter Fend - worked with Petersen projection (Lippard 1997) p 80
- Peter Dykhuis - exhibition of 'world views' during G7 summit in Halifax, world maps published by each of the G7 countries placed side-by-side. 'Seeing them all side-by-side, the differences between maps are striking. Aspects of their design and choice of colour seem to embody national stereotypes - the Japanese map looking understated, with light, cool colours, while the Italian map is bold and funky, with wildly curvaceous lettering. Each of these superpowers locates itself towards the centre of the world, and relegates the rest of the world more or less to the margins.' (Lippard 1997) p 80
- 'Florence Ladd asked a group of urban African American youths in California to draw maps of their neighborhood and received widely diverse interpretations.' (Lippard 1997) p 80
- 'Stanley ("this way") Brouwn - exhibited scribbled pencil maps made by people in Amsterdam from whom he asked directions to a well-known landmark.' (Lippard 1997) p 80.
- 'Working with only a biro and a camera, and with no knowledge of the area, Hugh Davies representing Analogue Art Map spent the 2006 Conflux Festival seeking hand drawn maps from locals in the Brooklyn NY area. These maps gave directions to sources of food, water and rest as well as to possible points of

interest. As each map begins where the last ended, the maps link together to form a linear journey or narrative told by multiple authors.' (Davies 2006)

- 'Six Contemporary Artists Who Use Maps in Their Work' (www.artjunction.org 2009)
- Uncharted Territory: Subjective Mapping by Artists and Cartographers (www.saulgallery.com 2004)
- 'Gnomon was an eight-foot-high, two-thousand-pound self-propelled sculpture that used GPS to identify the location where it was supposed to be.' (Wilson 2008) p 292 As the GPS location information is not stable this sculpture continuously moved about the gallery space, bumping into walls as it tried to fix its location.
- Catalogue of 218 Map artists (Cosgrove 2006) p61-67

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SIMULATING SYNAESTHESIA IN REAL-TIME PERFORMANCE: USING SUBJECTIVE USER-INTERACTION MODELS IN 3D SPATIAL ENVIRONMENTS

STEVE GIBSON

In this paper the author will describe and show examples of his live audio-visual work for 3D spatial environments. These projects use motion tracking technology to enable users to interact with sound, light and video using their body movements in 3D space, simulating the effect of synaesthesia.



Figure 1: Virtual DJ, 2005. Steve Gibson, Live at Stealth Attack Nottingham, Incubation 2005 Conference. Photo by Jonathan Griffiths.

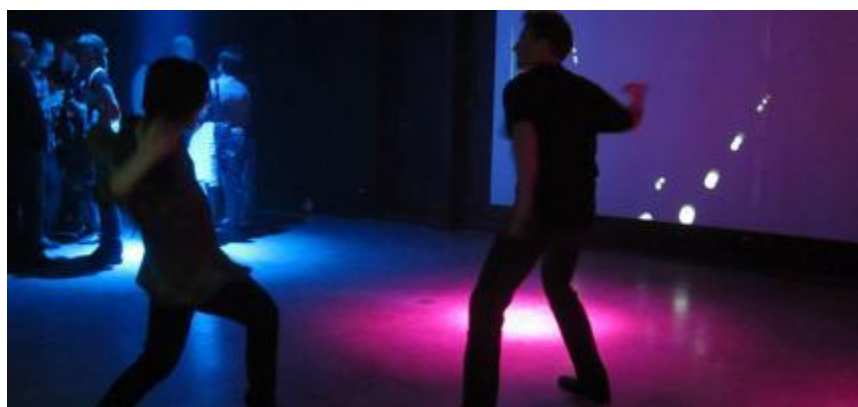


Figure 2 - Virtual VJ, 2011. Steve Gibson and Stefan Müller Arisona. Performed by Steve Gibson & Maria Lantin. Culture Lab CHI 2011 party, Emily Carr University of Art and Design, Vancouver, BC. Photo by Atau Tanaka.

Using the tracking capabilities of the *Gesture and Media System* - invented by APR of Edmonton, Canada - two or more users can use space as an audio and video remix or performance tool. The *Gesture and Media System* allows artists to "map" an interactive space with sound, light and images, and to have user-movement dynamically control these elements via small 3D trackers.

In the author's spatial projects audience members can interact with sound, light and video in real-time by simply moving around in space with a tracker in hand. Changes in sound, light and real-time visual effects can be synchronized with changes in sound and or light (i.e. music volume = light brightness = video opacity). These changes can be dynamically mapped in real-time to allow the user to consolidate the roles of DJ, VJ and light designer in one interface. This interaction model simulates the effect of synaesthesia, in which certain people experience light or colour in response to musical tones.

Synaesthesia

Synaesthesia is a condition in which a person experiences sensations from one sense in a second different sense. The likely most common occurrence is a description of colour related to musical tones. "How does it feel to hear music in color, or to see someone's name in color? These are examples of synesthesia, a neurological phenomenon that occurs when a stimulus in one sense modality immediately evokes a sensation in another sense modality. Literally, "synesthesia" means to perceive (*esthesia*) together (*syn*)." [1]

VIRTUAL DJ Concept

The original concept of *Virtual DJ* was to create a virtual room in which the audience could interact with sound and light by simply moving around with a tracker in hand. With an acknowledgement to the obvious connections with the earlier work of David Rokeby, [2] *Virtual DJ* is designed as a comparatively populist project, one in which the audience can interact in a very physical, almost aerobic manner to dance-oriented electronic music.

Virtual DJ uses two motion-trackers, one controlling drum and bass, and the second controlling melodies and samples. Certain motions have been standardised to create specific sound effects: raising the hand in the melody tracker usually results in a rising melody, raising the drum and bass tracker results in a change of drum patterns. Similarly lights are used to give the users a physical sense of the sound zones in the room: when users move within sound zones lights dynamically change in synch with their movements. This interaction model simulates the effect of synaesthesia, in which certain people experience light or colour in response to musical tones.

In *Virtual DJ* the 3D space has been mapped meticulously to allow users to have a satisfying interactive experience regardless of the style of their interaction. The spatial mapping was reworked based on the results from beta tests of hundreds of users over a two-three year period. These tests were both formal (i.e. measured beta tests in a controlled studio environment in which I wrote down user reactions and responses) and informal (i.e. resulting from a performance after which I arranged a follow up studio session with users).

Virtual DJ uses robotic lights to simulate the behaviour of humans and to represent human agency. The environment of *Virtual DJ* exists as a living, sounding space that behaves in a predictable manner in

relation to the user. To the casual observer it seems as if the space is alive; to the performer the precise matching of sound and light gives the air an almost tactile quality.

VIRTUAL VJ Concept

Virtual VJ takes the concept of *Virtual DJ* one step further and unites the role of the DJ and VJ into one interface: 3D space. The concept of *Virtual VJ* is to allow two users to control different aspects of the sound and video environment with their movements. One tracker is set to trigger sound and video and the other is set to manipulate the sound and video initiated by the first tracker.

The key conceptual idea that is explored is the idea of cooperation and the sense of personal space in ephemeral, virtual systems. This is achieved by programming the trackers so that dramatic events will happen when the two trackers are close together or at a distance. For example the environment has been programmed so that the trackers apply dramatic effects such as distortion to the audio when they are proximate to each other or reverb when they are distant from each other. This results in a game of cat and mouse in which the users determine whether they will choose to closely follow the movements of the other participant or pursue a more individual experience.

Enabling Subjective User Interaction In 3D Spatial Environments

Both *Virtual DJ* and *Virtual VJ* are based on the basic interface design strategy of using redundancy to enhance immediate user interaction. In common usage redundancy is often thought of a negative term, but in computer-controlled environments the use of redundant information in an interface design can often lead to greater user clarity, particularly when the information between mediums is sufficiently obvious.

In *Virtual DJ* lights and sound are matched very precisely. When a user perceives a change in sound due to a movement, the lights will change in a similar manner. This redundant information over the two mediums allows users to experience a more tactile sense of space and to more easily infer how their interactions are affecting the audio-visual environment. In *Virtual VJ* the redundant information is passed between the audio and video realms in a similar manner to *Virtual DJ*.

Similarly both environments have been mapped in a way that allows them to at all times produce a predictable result (i.e in *Virtual VJ* raising the hands will usually produce a rise in volume and an increase in image opacity). At the same time users are free to roam wherever they wish, to combine audio and visuals in whatever manner they chose.

This predictability is in fact an asset in that it allows users to lose their self-consciousness when interacting: they do not fear playing “wrong notes”. This is in opposition to many similar environments in which users are often mystified by the interaction model due to a lack of spatial planning or an over-complex interaction model. On the other hand the spatial mapping in *Virtual DJ* is quite complex; in many areas of the room several parameters are changed simultaneously by different motions; however, because the changes are logically mapped to movements and the results are predictable and repeatable, users gain a sense of control that they would not otherwise have in more “randomly” mapped spatial environments.

Conclusion

Using a combination of motion-tracking with matched live video, sound and light, the artist can create the illusion of synaesthesia for participants and viewers. Users can intuit spatial interaction interfaces more effectively with redundant information programmed between the different mediums. This assists both users and viewers with interactivity in the unfamiliar medium of 3D spatial environments and helps establish formal and aesthetic meaning, and avoiding the pitfalls of random and over-complex interface design and programming.

Acknowledgments

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ADVANCED MEDIA CONTROL THROUGH DRAWING: USING A GRAPHICS TABLET TO CONTROL COMPLEX AUDIO AND VIDEO DATA IN A LIVE CONTEXT

Steve Gibson & Justin Love

This paper demonstrates the results of the authors' Wacom tablet MIDI user interface. This application enables users' drawing actions on a graphics tablet to control audio and video parameters in real-time. The programming affords five degrees (x, y, pressure, x tilt, y tilt) of concurrent control for use in any audio or video software capable of receiving and processing MIDI data.

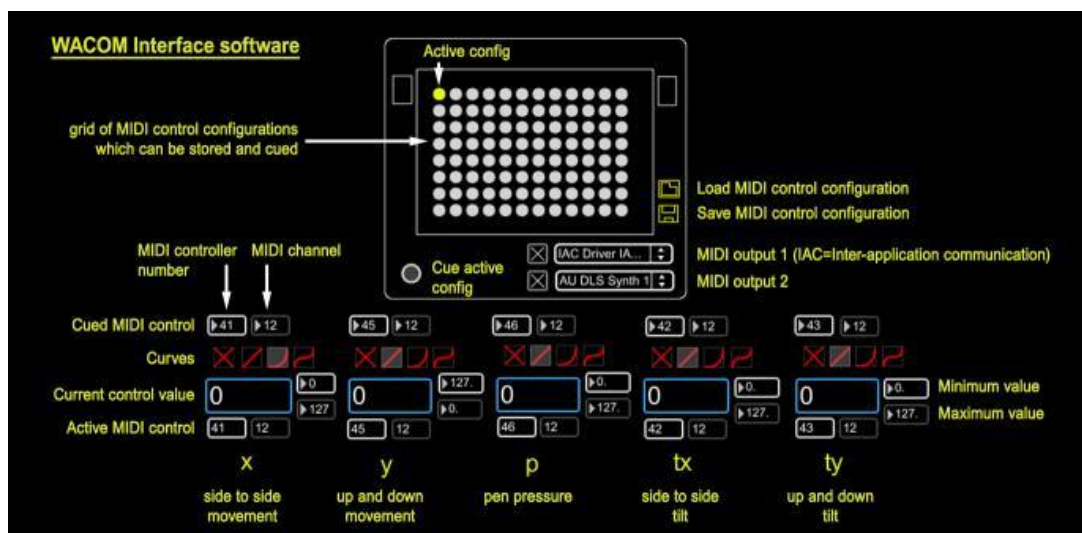


Fig. 1 - Wacom Interface with explanation, Justin Love and Steve Gibson, 2008-09.

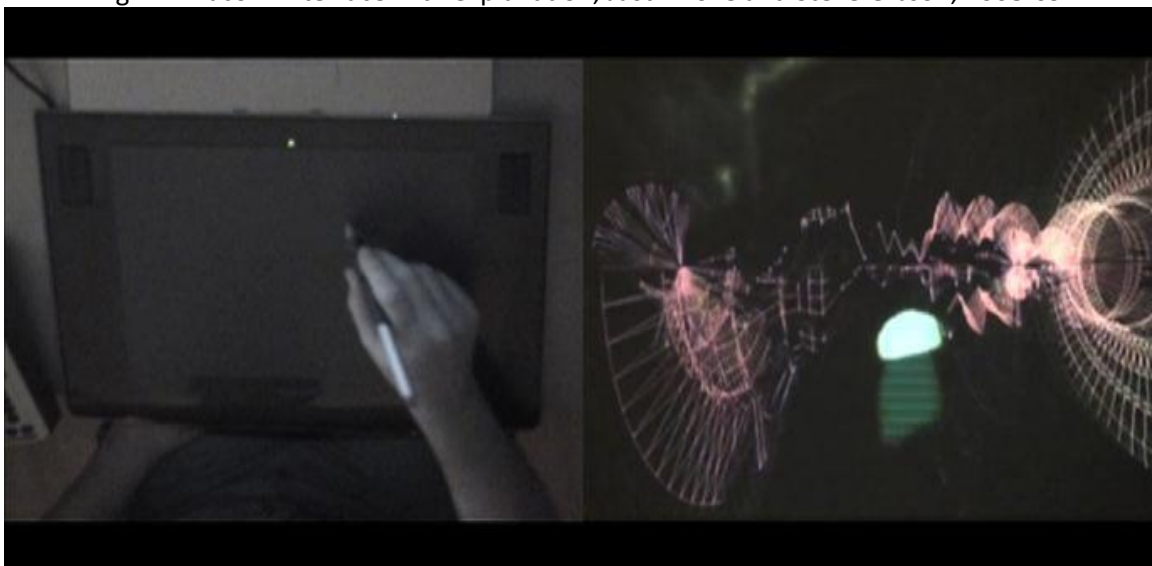


Fig. 2 – Wacom Tablet MIDI Demo. Live performance by Steve Gibson, January 2010. Video by Steve Gibson, 2010.

Introduction

The paper considers the connection between drawing technique and media control both generally and specifically, postulating that dynamic drawing in a live context creates a performance mode not dissimilar to performing on a musical instrument or conducting with a baton. The use of a dynamic and physical real-time media interface re-inserts body actions into live media performance in a compelling manner. Performers can learn to “draw/play” the graphics tablet as a musical and visual “instrument”, creating a new and uniquely idiomatic form of electronic drawing.

Electronic drawing is generally (though not exclusively) limited to pictorial or representational drawing with a pen and graphics tablet in order to produce still images or frames for animations in software such as Adobe Flash. Given the authors’ background in media art, physical computing and transmedia applications, we were more interested in the idea of repurposing the graphics tablet as media control device. We were particularly interested in the act of electronic drawing as a means of manipulating sound and video rather than as an output to an actual drawing, whether on-screen or for print.

Other 3D “tablet-like” devices have been used for manipulating sound, including the popular Kaoss Pad from Korg. [1] These devices are generally very limited in size: the Kaoss Mini KP has the following dimensions: 4.17 in (W) x 5.08 in (D). In the context of live performance this size does not allow for dramatic gesture.

The notion of the dramatic gesture was very important for us since we wanted to use a tablet as the only visible performance element. It was imperative that the audience be able to identify performer gesture with perceptible results in the media used (live sound and video in our case). To achieve this aim a larger area for drawing would be required. Finally, another limitation of other 3D controllers such as the KAOSS pad is that they are ‘only’ 3D. In order to achieve complex control of the media elements through our drawing actions, we wanted to be able to use more than three parameters at a time.

For the above reasons we decided to use a graphics tablet as a control device for gestural performance, and in particular we selected the Intuos 3 from Wacom (now superseded by the Intuos 4. [2] The Intuos 3 is 9 inches x 12 inches in dimension and has five degrees of control. This large surface combined with five possible control parameters made it an ideal choice. Also the fact that one uses a pen with a graphics tablet makes it more useful as a performance instrument, since the pen is a visible object that audience members can identify in much the same way as they would a conductor’s baton (though the audio-visual results we aspired to were quite different from those of an orchestra).

Background: Live music performance as a visual medium

Our interest in repurposing a device such as a graphics tablet for media control stems from the authors’ dissatisfaction with certain modes of electronic music performance. Live music has traditionally been experienced as a partially visual medium, with the visible actions of the performer holding the attention of the listener: “Making music involves not only the communication of musical sounds but is also characterized by a continuously changing and meaningful use of facial expressions, body movements, and hand gestures. Until the late nineteenth century, music performances were almost always experienced as audio-visually integrated activities.” [3]

With the advent of electro-acoustic “tape-based” music in academic electronic music and laptop performance in popular electronic music, the visual reference of the performer became “un-stuck” from the resulting sound produced in a live performance scenario. The relatively long history of tape-based electro-acoustic music has attempted to deal with the lack of performance spectacle by ever-increasing complex “diffusions” of the sound in space. This often involves ever-increasing numbers of speakers placed strategically throughout the room. For example, the BEAST “diffusion” system at Birmingham University has “over 100 discrete channels” of sound available. [4]

When used effectively this can create a sort of architectural soundscape, in which the listener follows the sound around the speakers and thereby intuits an image of sound as an object in space, albeit virtually. For the most part though, it is hard to avoid the conclusion that the use of ever-increasing numbers of speakers is a rather desperate ploy to obfuscate the fact that the audience does not easily respond to music in the absence of the visual spectacle of the performer. In short, in the majority of cases, the tape-music concert is one that generally does not satisfy the audience need for performance complexity. The genuinely live performance event has possibilities for variation, expression, errors, and communication with the listeners/viewers that are lacking in purely tape-based performances.

Similarly, pure laptop-based popular electronic music faces a similar crisis. When the performer is hidden behind the screen, it is simply impossible to recognize or even infer what he or she might be doing. As with tape-based music, the visual aspect in laptop performance is reduced to a virtually-inferred spectacle at best. (It should be said that in laptop performance there is at least the presence of an actual performer, and though it may be difficult to ascertain his or her actions, at least he or she is generally doing ‘something’ live).

The introduction of physically expressive performance aspects into electronic music has increased in the past ten to fifteen years. With improvements in computer speeds and the growing number of gesturally expressive media control devices available, electronic music has become increasingly engaging within a genuine performance context. The laptop is still employed live in most cases, but at least it is being controlled by a performer with some other device that the audience can relate to as an instrument. In this regard the live electronic performance medium (with a physically present and “active” performer) bears some resemblance to the drawing medium, in that deliberate and unconscious gestures in time form a basis for the artist input in both mediums. In both drawing and live performance errors are allowed (or are, at the least, quite inevitable). Meandering, testing, chance, and happy accidents in improvisational or semi-improvisational mediums such as live electronic music or DJing, are quite relatable to doodling, dreaming and sketching in the field of drawing.

Background: The VJ as live performer

It is worth noting that the VJ faces a similar problem to that of the laptop performer: how do his or her actions relate to the music and visual performance and how does the audience perceive those actions as in any way corresponding to the audio-visual results? VJing generally relies heavily on digital signal processing (DSP), in which the VJ software detects aspects of the incoming audio (e.g. hard attack beats coming from a kick drum) and consequently applies effects, cross-fades, or clip edits based on that information. This normally creates an obvious connection between the audio performance and the resulting visual world, at least on the rhythmic level.

While these DSP tools provide a solid automatic connection between the audio and video in a VJ performance, there remains the presence of the VJ performer: as with laptop music performance, in the absence of any noticeable interface beside the laptop, the performer's actions are somewhat mystifying to the audience.

For the above reasons we decided that the graphics tablet served as a potent tool for uniting the DJ (or electronic musician) and the VJ under a single interface. In addition by using the large surface of the tablet as an interaction device we created a dynamic performance instrument that the audience could relate to in a very physical manner.

Initial research

Our initial research into programming options for using MIDI with a Wacom tablet uncovered some pre-made applications, but in general we were unsatisfied with the both the usability and “look and feel” of these solutions. For example, one such application that we considered was the “Tablet 2 MIDI” interface developed by Livelab in Denmark. [5] This program allows complex mapping of MIDI data to multiple parts of the graphics tablet. The essential problem with this model is that it uses a complex menu-driven user-interface that is not intuitive. In addition the application is Windows-only, and given the fact that the authors (and much of the digital media community) are Mac users, we determined that this “off-the-shelf” solution was not ultimately viable. If we wanted a solution that would meet our needs and the needs of a more general digital media community, it would be necessary to develop our own alternative application.

For this reason we decided to look at creating our own interface using Max from Cycling 74. [6] Max has an application programming interface (API) that allows users to create their own external objects. The extensibility and modularity of Max has resulted in a large community of developers that create and share their custom Max external objects. To implement our interface we incorporated a Max external object designed by Olaf Matthes that outputs data produced by the Wacom Tablet. [7] In the Max patch, the data from the Wacom tablet is routed and mapped to a series of user-definable MIDI messages that can then be used to produce audio and video manipulations and transformations.

Interface design

It was essential that the interface that we created be entirely contained in one window, with no need for submenus or even normal file menus. Fig. 1 illustrates our basic interface design. Side-to-side (x), up-and-down (y), pressure (p), tilt x (tx), and tilt y (ty) can each be mapped to any of 127 possible MIDI control change parameters on 16 different MIDI channels. In addition, control curves can be applied to each parameter. For example, a linear control curve produces a consistent rate of change for a given parameter, whereas an exponential control curve causes a parameter to change slowly at first and then increase rapidly towards the end. The MIDI output can be routed to two different MIDI ports simultaneously. The grid at the top allows the user to save up to 96 different MIDI control change setups in one file.

Connecting with audio and video

To connect our application with other MIDI software, we used Interapplication MIDI. This allowed us to instantly map tablet actions to an effect or parameter in the audio or video software. Naturally only five

tablet parameters can be used to control video or audio data at the same time, but it is possible to route the same MIDI control data to multiple functions in the video or audio applications. With the grid of 96 storable configurations, once the user gets tired of the same configuration a new one can be loaded instantaneously. It is possible to cue a configuration (similar to how a DJ would cue a new track) and press one button to immediately activate the new setup.

The applications we use with our tablet audio-visual interaction are Ableton Live (for audio) and Modul8 (for video). Both of these programs are ideal for live audio-visual performance as they have extensive MIDI support and are built for non-linear performance situations in which the user may want to change, modify or apply effects to audio-visual materials instantaneously.

The tablet as a live performance device

With the possibility of seemingly endless mappings of tablet data to corresponding audio and video effects we were acutely aware that some sort of logical mapping structure would have to be established in order to allow the interface to be used effectively in a performance situation. This harkens back to the concern that we had at the outset: we wanted to be sure that tablet actions had observable results so that audience members would be able to clearly identify the relationship between the live drawing and the performed audio-visual elements.

In the past Steve Gibson has worked on several projects which explore 3D interfaces and the connections between audio and video mappings and 3D control. The most important of these projects was *Virtual DJ*, in which the user is given control over an audio environment and lighting effects by moving in 3D space. [8] In short this project used standard control configurations between user actions and results in the audio-visual system. For example, raising the hands would generally play an upwards melody and with each new note a light would change colour. This allowed the user to identify that their motions were having observable and repeatable effects in both the audio and visual realms. In essence this simulated the effects of synaesthesia, a condition in which persons can often see colours in response to particular sounds, tones or musical notes: “Synesthesia is an involuntary joining in which the real information of one sense is accompanied by a perception in another sense.” [9]

For our tablet interactions we thought of the tablet interface as a miniaturised version of the multi-dimensional spatial interface used in *Virtual DJ*. Thus logical interactions could be inferred by testing user actions with system results. For instance, drawing on the y-plane on the tablet (up-down) could logically map to audio volume or low-pass filter (which would have a similar effect to volume, without completely removing the sound at the bottom of the tablet) and image opacity. Therefore we built a limited series of controls to be employed by the user on the tablet and held to these controls throughout our performance. The videos at the following two links show how three of the tablet parameters (x, y and p) were mapped to audio effects:

http://www.telebody.ws/TRACEY/Tablet_demo1.mov

http://www.telebody.ws/TRACEY/Tablet_demo2.mov

Conclusions

In summation we have found that the Wacom graphics tablet is a powerful device for controlling live audio and video in a performance situation. The act of live drawing, though here removed from its traditional reference to a produced “drawing” (either on-screen or in print), is one that allows for dramatic gesture in a way that pressing keys on a computer keyboard or moving a mouse could never hope to achieve. In addition the fact that the graphics tablet can unite five degrees of control over live audio and video makes it an ideal tool to consolidate the roles of the DJ and the VJ under one control interface. Finally we present a live example of the tablet used in a performance situation with one of the authors controlling live audio and video with his drawing actions (Fig. 2): http://www.telebody.ws/TRACEY/Tablet_Demo_Split.mov.

The Wacom MIDI software can be downloaded at: <http://www.roguescience.org/files/wacom2MIDI.zip>.

Learn how to setup the Wacom MIDI software to use with your Wacom tablet: http://www.telebody.ws/TRACEY/Wacom_MIDI_Setup_Demo.mov.

Note

A longer version of this paper was originally published by TRACEY as part of their Drawing and Technology issue: <http://www.lboro.ac.uk/departments/sota/tracey/dat/gibson-love.html>

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DIGITAL PUBLICS: PROMISES AND PROBLEMS OF A CYBER-REVOLUTION

Philip Glahn

Reconsidering the historical avant-garde's engagement with the "mechanization of experience," organizations like Mikro.fm seek social innovation through digital technology, facilitating a redistribution of the ownership of the means of knowledge production. Looking to Brecht's radio theory, the Berlin-based group engages in a heterotopia of pragmatic collectivism, wary of making the bourgeois public sphere's empty gestures of participation.

Digital Publics: Promises and Problems of a Cyber-Revolution

Reconsidering Sergei Eisenstein's unfinished *Capital* project, German filmmaker Alexander Kluge recently contemplated the abiding potential of cooperative production: "A constellation of corresponding works. That's how Eisenstein's spherical dramaturgy is to be understood. Not a utopia but a heterotopia: right next door something is possible." [1] What sounds vaguely like a nostalgic, rhizomic relativism is in fact a strategic demand for the fulfillment of the historical avant-garde project. Kluge's own films, including his 2008 *Nachrichten aus der ideologischen Antike: Marx – Eisenstein – Das Kapital*, promote "relationality": the notion of the cultural arena as a site of struggle over meaning and visibility, the means of making sense and spreading it around by establishing connections, or "striking sparks," between positions. Emphasizing the use-value of artistic labor and the functionality of its products, Kluge's Eisenstein project aims to make the relationships of production tangible – between the real and the ideal, history and myth, experience and fantasy – to, in Eisenstein's own words, "teach the worker to think dialectically." [2]

For Kluge, the procedures and proceedings of 1920s and '30s radical art imply the very pragmatic possibility of implementing substantial contemporary socio-cultural transformation through art nearly a century later. Indeed, conditions central to the historical avant-garde project no longer seem as antiquated as they did during and even immediately following the Cold War. New networks of information dissemination and economic dependencies, the political and social struggles in the East and Middle East, and the recent crisis of global capitalism have shaken traditional ways of governing people, properties, and worlds to their foundation, giving questions of socialism, technological progress, and class a renewed validity and urgency. New media art and activism in particular has for well over a decade acknowledged, considered, and elaborated on the changes in our socio-technical landscape. As digital forms of information exchange and knowledge-labor blur traditional boundaries of community and identity, "tele-" and "cyber-communism" declare the dawn of a new sociopolitical era that in many ways harks back to that of the historical avant-garde.

New media art and activist organizations sound a strikingly Productivist and Brechtian tone in their avowals to employ digital technology to turn consumers into producers, availing mass participation for social innovation. These groups reprogram GPS devices to map new ways to navigate urban environments, devise open-source software for redrawing eco-political landscapes, and organize festivals and workshops for the collaborative production and broad dissemination of information and technological know-how. As such practices seek to reconstruct the public sphere, the question remains whether the access to information and the technological means of its production actually redistribute ownership of

knowledge, labor, and experience, fomenting real action and agency, or whether such projects further institutionalize an ideal bourgeois public sphere by creating a mere semblance of cultural participation.

The Berlin-based collective mikro.fm provides an example of a contemporary practice seeking to combine and maximize the potential of both old and new media to form evolving and strategically contingent constellations. Like many other new media communications initiatives, mikro.fm provides free, non-commercial public access to online and airwave studios as well as the know-how necessary to fabricate and use portable transmitters. Steeped in the traditional conflict of communicative technologies (the radio apparatus as much as the Web) between the material promise of unregulated, democratic exchange on the one hand and its populist and private appropriation on the other, mikro.fm holds workshops and gives presentations, circulating ideas and instructions via airwaves and the Internet advocating the portable transmitters as a way to produce, receive, and pass on stories and news, fantasies and perspectives excluded from or marginalized in the mainstream media.

If indeed, as some have observed, today's socio-economic and psychological climate recalls that of the Weimar Republic and its "experience of mechanization," a critical look at the medium of radio at its moment of original popularity, at the historic crossroads between barbaric instrumentalization and emancipatory utility, proves instructive in contemporary debates about the revolutionary function of new media art and activism. Regarding its own heterotopia of direct, proximate usefulness through the active everyday production and dissemination of broadcast programs, mikro.fm has looked to Bertolt Brecht's "Radiotheorie." [3] Like culture in general and theater and film in particular, to Brecht the radio has no value in and of itself but is defined entirely by its use. In the hands of the bourgeoisie, according to Brecht, the radio is anything but a "mass medium": delivering "Viennese waltzes and cooking recipes," pseudo-debates and purely commercial art, it has, in a reversal of the potential function of the broadcast apparatus, an individualizing and inactivating effect on its audience. [4] In this case a new medium is used paradoxically to reproduce old contents, habits, and relations.

In his 1932 essay "The Radio as an Apparatus of Communication," Brecht famously remarked that "the radio is one-sided where it should be two," advocating the ability to literally talk back, to discuss via the apparatus of transmission. [5] Perhaps more importantly, Brecht's call for material as well as ideological innovation through the transformation of the radio demands that what is being communicated must have relevance to the audience and engage the listener as a speaker. The objective is to turn the audience "not only into pupils but into teachers." [6] Accordingly, "re-transmission" is as important to mikro.fm as the distribution of original content. Listeners are encouraged to engage with themes like nuclear power and the census, anti-Semitism and "medial creativity," navigating and contending with a multiplicity of official narratives, alternative concepts, and personal experiences. Topics are discussed in contexts ranging from the general to the local, the historical to the present-day. The soldering workshops connect technical labor with the anticipated intellectual and social labor of using the apparatus as a communicative device, fostering an awareness of the way in which the skill of "making" functions on several levels. It furthermore imparts a sense of sober functionality over techno-euphoric spectacle. The utility of the self-made transmitters, as well as the collective's recent "editorial" work with the Berlin station "PI Radio" (the PI standing for "pilots" or "pioneer"), is part of their effort to counter "anonymous media consumption" by producing and promoting online networks and "radio clouds," echoing Brecht's idea of the radio as "a network of pipes" that "turns listeners into suppliers." [7] True innovation means to go beyond participation as a gesture and turn it into an action of agency.

As with the Eisensteinian constellation, the relationality afforded by mikro.fm's projects is not restricted to the technological dimension of accessibility. To strike sparks between positions does not suggest to

merely plug into the apparatus, but rather to establish an exchange between different modes of production – of experiences, ideas, identities – to acknowledge the public sphere as an arena where one’s position as spectator and producer stands in critical proximity to the institutions of information distribution and their discursive regulations. The redistribution of ownership demands that for cooperative production to be truly cooperative, it needs to impart the ability to participate in an evolving project of knowledge production (rather than reproduction), to articulate existing dependencies, limits, and possibilities. New media establishes proletarian public spheres where, as Brecht observed, the material and technical abilities to say anything to anybody are used to transform rather than maintain the existing social order, by “putting the listener into relation rather than isolating him.” [8]

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SYNTHETIC PHYSICS: IDEAS FOR NEW WORLDS

STEFAN GLASAUER

While the physical laws of our real universe cannot be modified, in virtual computer-generated worlds arbitrary physical laws can be implemented. However, critical constraints of synthesizing such physical laws are given by our sensorimotor system and by the consistency of the resulting virtual world. It is proposed that synthetic physics has an enormous potential not only for education but also for creating art using physical laws as medium.

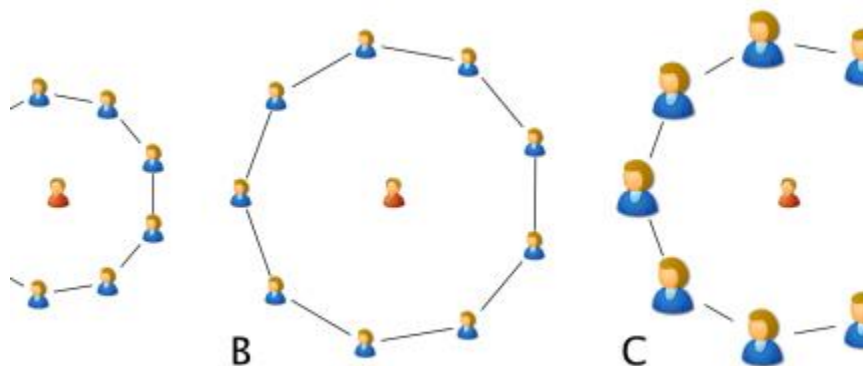


Figure 1: Example for the violation of consistency. A: initial situation: persons at a constant distance form a circle around the viewer. B: each person steps back so that their interpersonal distance increases and they can no longer touch each other. C: for the viewer in the center, the visual angle increases due to the Turtur-effect (see text), which means that the apparent distance between the persons seems to decrease: touching each other seems possible, while physically it is not.

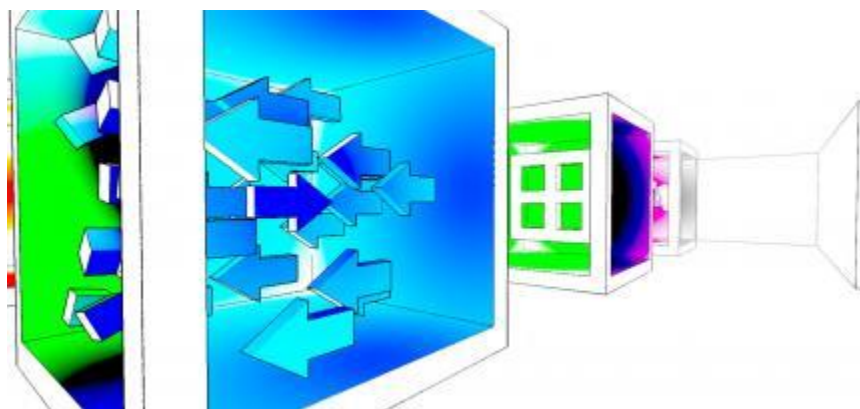


Figure 2: The computer game Antichamber [11], which claims to abandon Euclidean geometry (screenshot courtesy Alexander Bruce).

Introduction

When we enter one of the many virtual worlds available nowadays, be it a simple flat world represented in a browser game or a sophisticated three-dimensional world in a high-end computer game, we usually expect that most of the basic rules of every-day physics and geometry in the real world are implemented also in the virtual counterpart. The geometry is Euclidean, objects look smaller when farther away, there's an up and down, and if things fall, they fall down. Sometimes we can fly in a virtual world, sometimes things do not cast shadows, but in principle all the rules are a simplification of the real-world physical laws. But is that really necessary? Can't we go "beyond physics"? [1]

In the following, these rules or laws will for simplicity be called 'synthetic physics' – denoting not only the basic underlying rules of how objects and agents should physically interact with each other and the simulations performed by the so-called physics engine in game engineering, but also more generally all rules concerned with physics such as the topology of the simulated space or the laws of synthetic optics. So far, the designers of multi-user virtual worlds seem to have adopted the simplistic approach of taking the physical laws of reality, simplify, and use the result as blueprint for synthetic physics. But already in the mid-90s Michael Benedikt suggested that the space of possibilities allows for more. [2] After providing examples of 'impossible' physics - most of which are actually dealing with spatial topology rather than physics in the real-world sense - he proposed several principles meant to serve as guidelines for the successful design of cyberspace.

Real physics

Before discussing these design principles, we need to take a closer look on the real physical laws and the simplifications made by metaverse designers. Take any physics textbook, and you will immediately realize that not all physical laws are relevant for our experience of the world. Special relativity does not have any impact on our daily life, and we need not be aware of quantum physics to catch a ball. In fact, we do not even need to know about Newtonian physics; mankind did well without explicitly knowing about it for most of its history. However, when trying to design a considerably convincing replica of the real world, it becomes important to consider which physical laws should be implemented. To date, the sensorimotor constraints in interacting with a virtual world are provided by the interface technology. The main sensory input supplied by multi-user virtual worlds is vision and audition, the latter often playing a subordinate role. Consequently, the main effort in implementing real-world physics goes into providing a decent graphics engine, realistic sound sources, and rigid body dynamics. Other aspects of real-life physics such as fluid dynamics are usually omitted. Evidently, some omissions affect the amount of realism, whereas others do not, such as restricting the simulation of electromagnetic radiation to the visible spectrum rather than implementing, e.g., radio wavelengths. The simplifications lead to unreal – or hyper-real – [3] physical environments, which can provide an unexpected educational potential: virtual physics invite to experiment with physical laws rather than just simulating real physics. [3]

Psychophysics

Nonetheless, with the user being the central element of any virtual world, the implementation of physical rules needs to be adapted to the capabilities of the users. Here it is where psychophysics come into play: neuroscience, rapidly advancing during the past decades, and experimental psychology, building on

the psychophysical foundations laid out in the past century, tells us how perception works, how experiences are generated, how we react to changes in the world, and how we interact with the world and its objects. One of the most important insights is that we do not directly sense the physical properties of objects, but estimate them based on multisensory input and prior experience, which may be innate or acquired over time by learning. Our perception is thus an indirect estimation process rather than an accurate measurement of object properties. Besides relying on sensory information, the perceptual estimation processes are based on general assumptions about the world. Perhaps the most important one is the assumption of constancy (color constancy, size constancy, etc.). These constancy constraints or invariances, reflecting the statistics of the environment in which we live, are assumed by many researchers to be the basis for our perception. Our actions are shaped by knowledge about the statistical properties of the world and thus we implicitly assume that the statistics of the world do not change rapidly. We thus may formulate, following Benedikt, [2] a 'Principle of Constancy' for the design of virtual physics to meet the abilities of our human perceptual and motor systems.

But which of the properties of the real world need to be preserved in a virtual world for humans to be able to interact with it? In our opinion, some of the a-priori assumptions of everyday sensorimotor processing, such as the existence of gravity, need not to be implemented and can be ignored without significantly affecting action and perception within virtual environments. But we seem to be able to deal with much more drastic alterations: a recent study claims convincingly that humans, given extensive training, are able to efficiently navigate a four-dimensional maze-world. [4] Thus, we apparently can adapt to properties of a virtual environment that most of us consider as being completely unimaginable. Another study investigated how humans behave in physically impossible environments and whether they consciously notice the violations of Euclidean metrics or planar topology. [5] The surprising and conceptually far-reaching finding is: you do not realize it. And you behave just like in a normal virtual environment that mirrors the metrical and topological properties of the real world. Thus, in contrast to Kantian ideas, a-priori properties of space such as Euclidean geometry do not seem to be required for spatial behavior.

Alternative physics

Can we thus conceive of alternative physics, which, nonetheless, allow for interaction with content, be it user-created or supplied by the virtual world, and with other users? We think that it is possible to create virtual worlds with such alternative physics without completely disorienting the users. It could even be possible to have different physics within a single virtual world, allowing the user to change certain physical parameters, properties, or even rules within a given, carefully selected set of meta-rules. This set of meta-rules needs yet to be defined, and an interdisciplinary approach of physics, mathematics, and cognitive science will be required to do so. Creativity paired with analytical capabilities and profound knowledge is asked for to design such a rule set with its most important ingredient being consistency.

Let us take an example from fiction to illustrate what consistency means. Michael Ende describes in his novel for children "Jim Button and Luke the Engine Driver" a character called Mr. Turtur. [6] Mr. Turtur is a pseudo-giant: he appears to be a giant when viewed from far away, but when you approach him, he seems to shrink and finally is just as tall as any other human being. This character works well within the novel, but would not be consistent as alternative physical possibility, since, for example, a normal person standing next to him and holding his hand would become inconsistent: either the arm of Mr. Turtur or that of the person holding it would need to be distorted to not appear to lose contact. One possible

solution seems to be that everything should grow in apparent size with increasing distance. But this solution would again violate consistency: imagine looking at a circle of people holding each other's hand around you. The circle is quite close to you (Figure 1A). If each person steps back a certain distance, they lose each other's hands, because the circle grows (Figure 1B) and the interpersonal distance increases. But for you it would *look* as if they could still hold their hands, since their apparent size grows (Figure 1C). Your view and the physical facts are thus no longer consistent, not to speak of how persons in the circle would appear to each other.

Note, however, that the notion of consistency does not contradict the finding that Euclidean geometry is not important to solve spatial tasks. [5] Even though it may seem as if a triangle with three 90° angles is inconsistent, it is, in fact, not inconsistent in itself but just with Euclidean geometry. Thus, in a different geometry, which is not physically possible in our world, the triangle can have three right angles.

The potentially beneficial use of breaking specific real-world assumptions for the design of interaction techniques has been investigated by Pierce & Pausch. [7] In their example, landmarks such as towers used to navigate over intermediate distances do not completely vanish with distance but remain at a minimum size. While this proposal, which clearly reminds of Mr. Turtur, breaks the continuity of space (the landmarks 'grow' relative to their surrounds), it can help users to navigate in an environment by serving as virtual beacon.

As Benedikt [2] points out, art and fiction have described many possible alternative worlds and the boundaries for the fantastic seem to be stretched as far as possible. We need not even go as far as theoretical physics, where exploring alternative worlds based on different laws is a serious branch of cosmology. Thought experiments of alternate worlds also have a long tradition in philosophy, e.g., Hilary Putnam's famous Twin Earth. However, these thought experiments or the many fantastical scenarios in fiction and art never left the stage of verbal description or depiction. Now the time is ripe to implement them in virtual worlds to be able to experience what it would mean to inhabit such a world and act within. The most recent examples giving us a clue of what might be possible are science-fiction movies such as "Inception" (written and directed by Christopher Nolan, 2010), in which 'virtual' worlds are created in order to serve as backdrop for dreams.

However, so far only very few developers of virtual worlds seem to go as far as abandoning Euclidean geometry: apart from the authors of the scientific study mentioned above, [5] Alexander Bruce is one of them. He is the developer of the yet to be released computer game Antichamber [8] that, according to his website, aims to be a "Philosophical First Person Single Player Exploration Puzzle Art Game" (Figure 2).

Physics as concept

From an artist's point of view, the whole story is completely different. Just as the potential of virtual worlds for scientific research has been emphasized repeatedly, there is an equally large potential for artistic discourse. But just as any other artwork, art using virtual worlds does not need to respect any boundaries, principles, or rules, and may even be more potent when those boundaries are violated. There are many examples in art history, specifically in the last century, where breaking the boundaries was an inherent element to successful artwork. To avoid misunderstandings: artists have, probably with few exceptions, never respected the laws of physics in their work. But that is not the point. Rather,

artists so far could hardly use physics, and here we mean the physical laws and constants, as a *changeable medium* of their work, because they did not have the possibility to modify anything about it. Even though artists such as the sculptor Richard Serra or the installation artist James Turrell may count as an exception in their explicit treatment of physical topics such as gravity, balance, and light, it only is now that an artist could design a new system of physics, be it consistent or not, and have visitors come and feel what it means to be inside such a world. The approach may be compared to ‘environments’ [9] in installation art or participatory performance art. This interaction between the work and the viewer, while present in all works of art, has a specific immersive quality in such environments, which effectively resembles the non-verbal dialogue between artist and viewer in performance art, especially if it demands participation. In both the installations and the performances, the visitor is not just viewer but active participant experiencing the real emotion rather than just being confronted with its representation. Consequently, work such as the ‘participatory objects’ of Robert Morris (Tate Gallery, 1971) explicitly form an environment in which the visitor becomes the actor of a performance. The same holds for visitors of virtual worlds: as soon as they enter and interact, they become part of the work and as such performers within an environment.

If we understand the physical laws as instructions underlying the universe, then we can see *physics as concept* in the sense of conceptual art. One of the most influential texts on conceptual art [10] explains that “The idea becomes a machine that makes the art.” Physics is the idea that makes the universe. And if the physical law was an artist’s idea, the resulting universe is art.

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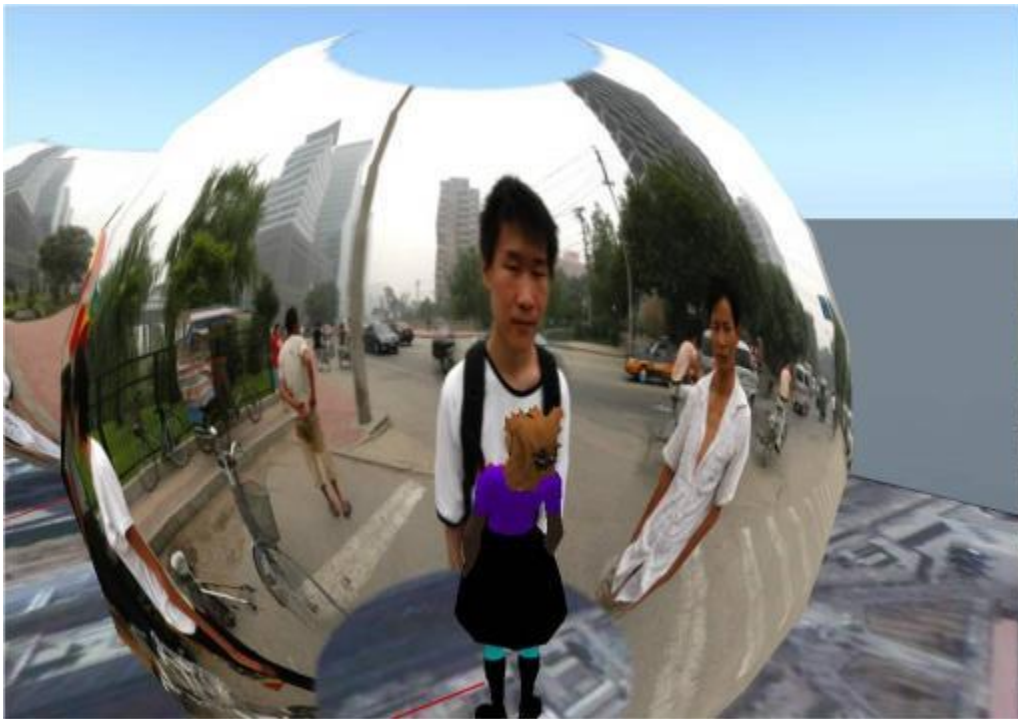
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DRIFTING AND IMAGING BEIJING

Maayan Glaser-Koren

Is John Craig Freeman's "Imaging Beijing" a contemporary expression of the Guy Debord's *dérive* theory, made possible in Second Life?

Freeman's overall project and its individual components such as "Imaging Beijing" are analyzed here through Jean Baudrillard's book *Simulacra and Simulations* (1981), and particularly his notion of the simulation.



In John Craig Freeman's Imaging Beijing, Second Life Installation, © 2008 Maayan Glaser-Koren

While discussing the contemporary American artist John Craig Freeman's *Imaging Beijing* I will evaluate how Guy Debord's notion of the *dérive* is applied to the internet environment while also discussing the ways in which Freeman's work challenges, tests, or confirms the *dérive* as a theory, followed by a discussion of its relevance today. Freeman's piece *Imaging Place* is an ongoing site specific artwork combining photography, video, documentary, 3D software, and virtual reality. The original project started in 1997 when Freeman began to document the locations he visited. Every location was documented and then installed into Second Life in 2006 [1]. These locations are depicted as a platform that merges satellite images of a specific site in the city, panoramic photography, and digital video. *Imaging Places* assembles different places in the world such as *Imaging Wall Street*, *Imaging Belfast*, and *Imaging Beijing*. Freeman's complete project and its individual components, such as *Imaging Beijing* (2007) can be analyzed through Guy Debord's *dérive*

Debord's theory of the *dérive* (1960s) refers to drifting throughout the city (Paris) in a rapid manner without planning ahead. The result is awareness of the environment and the surroundings. The subjects must separate themselves from the activities of daily life and especially from the media for this to be successful. Debord, writing in an era characterized by the soaring popularity of television and the wild proliferation of commercial media and advertising, noted that society itself was being transformed by technology. His *Society of the Spectacle* (1967) describes the emergence of a consumer society and proclaims that the spectacle that is mass media dehumanizes the Western world. Debord's proposed solution was the *dérive*, which was to arouse in subjects an increased interest in the geography of the city.

Debord claims that "in a *dérive* one or more persons during a certain period drop their relations, their work and leisure activities, and all their other usual motives for movement and action, and let themselves be drawn by the attractions of the terrain and the encounters they find there." [i] More compellingly, the *dérive* was to create new encounters between people and places that were not otherwise possible and through this allow for positive social change. The intent of the Situationist International Project and its leader, Debord, was to change the confined society of which it was a part [2]. Their goal was to battle against media saturation, boredom, and the capitalist co-option of life. The *dérive* was a situation the project constructed to disrupt social spaces.

John Craig Freeman's artworks emphasize the notion that in our Western contemporary society we are still influenced by the media and therefore do not pay attention to our surroundings. He claims that he uses the *dérive* because "it is a subversive act which calls into question the constructed social order of the city. It is my intention to do the same in the social spaces of the Internet." [ii] Is the experience of the *dérive* the same in the virtual world as in the Situationist's European city? In order to answer this question, I will examine if Freeman's claim is possible throughout the use of Second Life.

In Freeman's *dérive*, which is performed throughout the use of the virtual world, participants encounter his work through an avatar that takes the role of the *dérive*'s psychogeographer. This allows for a new awareness of the terrain. For example, in *Imaging Beijing*, one's avatar enters the city through satellite images and experiences it through panoramic documentary photographs. *In Imaging Beijing, the avatar's dérive starts from a satellite image of the disc of the earth. On earth there are rotating enter signs that indicate the cities on the map to which the avatar can teleport.*

China's capital city, Beijing, is represented by a satellite photograph from a Google map showing central Beijing and translated into virtual reality. On this platform are sixteen spheres, inside of which are panoramic photographs taken by Freeman during an actual visit to Beijing. On the platform are four each of red dates and paths connecting the spheres to the platform that indicate a location on the grid. Clicking any of the dates opens a blog, which includes Freeman's real-life documentation, stories, and photographs from the day he experienced in Beijing.

The idea that Beijing is represented by Google satellite image relates to Debord's notion of the spectacle. The spectacle can be the mass media, the consumer society, commodities, the consumption of images, spectacles, or contemporary capitalism and its effect on modern society. Therefore today's technology, for example, Internet Web sites, satellite images, and virtual worlds, are part of the spectacle. However, if *Imaging Beijing* is a spectacle, then how can it be a subversive art piece? In the essay *Debord and the Postmodern Turn: New Stages of the Spectacle* (1997), Best and Kellner suggest that virtual reality, computers, and multimedia are the new stages of the spectacle. They propose that there are two kinds of spectacle: an interactive spectacle and a pseudo spectacle. The first "is one that the individual herself has created." [iii] It can be one's Web site and chat room. The latter is created by "corporate

forces that themselves construct the spectacle in which one is merely a part," [iv] for example, television shows and radio talk shows that can monitor and control an individual's participation. Consequently, Freeman's *Imaging Beijing* is an interactive spectacle because it was created by an individual and is limited to the participants' experience.

The notion is that *Imaging Beijing*, as an interactive spectacle, is enhanced by narrations from a Beijing resident, Peter Guo. When an avatar stands in the center of each sphere, the audio narrative begins with Guo discussing his memories and childhood anecdotes from his life in Beijing. In a way, this is a point in virtual space where cyberspace, the real world, and the virtual world become one. For example, entering into these spheres provides one the experience of using a first perspective view of the actual location - a panoramic photograph, providing the sensation of being part of that location. Then, the experience is enhanced by real sounds such as Guo's voice, and the environmental sounds, contained in the audio clips. Moreover, Guo narrates the story in English and then in Mandarin. All of this creates a realistic sensation, a sense of knowing Beijing, its residents, and its atmosphere without physically being there, which results in a simulated *dérive*.

The *dérive* is a way to inhabit space. According to the Situationist International, the best place to perform the *dérive* is in an urban space. Participants in the *dérive* separate themselves from their daily activities such as jobs, media and leisure and are drawn out by the attractions and encounters in the city. Additionally, the more people who participate in the *dérive* as a group, the more likely they will conclude that the experience was rich. In addition, the *dérive* holds the idea of the psychogeography.

Debord's notion of psychogeography attempts to create a new awareness of the modern city and the urban landscape. According to Debord, it is a detailed study of how specific geographical environments affect the emotions and the behaviors of individuals.

Freeman's work interrogates Debord's notion of psychogeography and the *dérive* within new cyberspaces. *Imaging Beijing*, according to Freeman, expands the concept of the *dérive* on two different levels. He states: "There is the level that occurs in the field on location, such as in the Hutongs of Beijing. I am testing whether immersive media is capable of capturing and representing the experience of the urban drift and the resulting emergent situation. So there is a quasi-documentary side of the work." [v]

The second level, which extends the notion of the *dérive*, according to Freeman, is "at the delivery of the work as a new form, whether it is online or in an exhibition. This puts the avatar or audience in the role of the psychogeographer drifting through the virtual world. It is still an image, but one that you can navigate, explore, have adventures and social interactions in." [vi] In other words, the avatar navigates by walking into the spheres. Each sphere is different and includes different audio narratives by Guo. In addition, the sounds that surround him in the Hutong neighborhood enhance the sense of the exploration and adventure to navigate the spheres.

Exploration and navigation are part of the *dérive* that occur in Freeman's work as well as with the Situationist International. Furthermore, there are more similarities between the theory of the *dérive* and *Imaging Beijing* that Freeman applies to his work. First, the subject of both the *dérive* and *Imaging Beijing* is the modern city. Second, in both *dérive*, the navigation starts in a specific place, be it a street in Paris or the Earth disk in *Imaging Place*.

Finally, the *dérive* deals with chances of social engagements, unique conversations, and new relationships. When one drifts through a city, one encounters a large number of people, and therefore there are many possible encounters. The same happens in Second Life, where other avatars access the same place simultaneously. The virtual world allows people from all over the world to connect through the form of their avatars. The unfamiliar creates the opportunity to develop new relationships that will start with a chat. Furthermore, Freeman encourages the use of more than one avatar. This is because avatars can share their online experiences with other avatars they meet and add comments on his work. The same is true for the *dérive*, the more participants, the more objective the conclusion.

According to Freeman, "Like all good *dérive*, one must be willing to become lost." [vii] In *Imaging Beijing*, there is a feeling of losing one's sense of awareness, especially when entering the spheres. The avatar merges into a panoramic photograph of a real location in central Beijing. Thus, as the avatar merges with the location and the surroundings, a sense of true direction is lost. Moreover, because of the fusion between the avatar and the photograph, there is a sensation of mixed realities. The panoramic photographs, the sounds, and the audio narrative are real. The mix takes place when the avatar merges with those elements. Thus the lines between the realistic and the photographed landscapes are blurred. It becomes, according to the American philosopher Richard Kearny, a *pseudo-world* where "the line between the imaginary and the real has been abolished." [viii] This elimination of the boundaries among the real and the imaginary result in a simulated experience.

The simulation is a term that the contemporary theorist Jean Baudrillard discusses in his book *Simulacra and Simulation* (1981). Baudrillard claims that modern values can no longer be applied to current society and are considered dead. The existence of simulation, implosion, and hyperreality are the inability of the consciousness to distinguish between reality and fiction [ix]. This is partially due to the virtual world's ability to blur the lines between the two. Thus hyperreality also relates to simulation, which is the process of replacing real with virtual. By using virtual reality according to the theorist Sherry Turkle, we "blur the boundaries between self and game, self and role, self and simulation." [x]

Simulation is the reason why *Imaging Beijing* does not translate to the real experience of drifting in urban space. However, Freeman is not trying to do so. He simply investigates whether the *dérive* is possible in Second Life. *Imaging Beijing* is a semi-simulation of Freeman's real *dérive*, made specifically to install in Second Life. Thus the avatar only experiences one view of the urban city, as it appears in the eye of the artist creating the virtual installation.

To conclude, Freeman has already acknowledged in his project *Imaging Places* that he is inspired by the ideas of the *dérive*. He is not trying to replicate the *dérive*, but he uses the geography in such a way as to develop "new practices for the Internet." [xi] He has succeeded in bringing the technique of the psychogeography into Second Life with *Imaging Beijing*. The avatar is a psychogeographer, drifting through the satellite images of Beijing, and it experiences the Hutong neighborhood by entering into and merging with the panoramic photographs contained therein.

However, the navigation—the drift—is done by sitting at home in front of the screen. There are no real dangers that one encounters in a real *dérive*; the avatar cannot be injured by walking on the virtual platform. This is different from Debord's notion of the *dérive* where risks are part of the drift in the modern city. Because there is no risk, sitting in front of the screen makes the participant a spectator, which is the opposite to the intent of the *dérive*. The participant using his avatar is not getting out of the house and being drawn to the city's possibilities.

Furthermore, he is being seduced by the interactive simulation and is therefore engaged in a new stage of the spectacle. Then again, the avatar still navigates through virtual space. It is a mix of spectator and navigator. Could this be the next step in the evolution of the *dérive*? Does this suggest that the spectator/navigator must participate in a particular way in order to have a more random encounter, and thus a "*dérive*"? And if so, does this work reflect back on Debord's original theory of the *dérive*, suggesting that in the city, as well, the spectator/navigator has a degree of agency and responsibility? These questions are difficult to answer because in some ways *Imaging Beijing* is a spectacle.

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[1] *Second Life* is a 3D virtual world that developed by Linden Lab. It is a place where *Second Life* users can interact with each other through their virtual resident an avatar.

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[ix] Jean Baudrillard, *Simulacra and Simulation* (Michigan: University of Michigan Press, 1995), 126.

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RANDOM WAR: WHEN ART SPEAKS THROUGH SOCIAL MEDIA

JANICE M. GLOWSKI

Social media is not art, but in the hands of artist Charles A. Csuri and gaming programmers Devin Moore and Wesley Adams, it has become the next playground for a 'Happening.'

A young woman sits at her computer. The archaic sound of a telegraph machine clicks rhythmically, while the names of her friends and family neatly appear across the top of the screen. The synchronized sound and words contrast with the random flashes of red and black 'army men,' who appear in a dizzying and constantly changing array below the letters. She has entered an artist's game called *Random War* (2011).

In Kaprow-esque fashion, artist Charles A. Csuri has placed his renowned work *Random War* (1967) in the hands of people using Facebook, one of the most popular social networking sites of our day. The online version of *Random War* (2011) takes its conceptual cues from the original *Random War* (1967), which used a random number generator to determine which of Csuri's colleagues, friends or a number of famous people, would be slated to one of five categories: "Dead," "Wounded," "Missing," "Survived," or "Medals Awarded." In the original work, the names that Csuri typed into the mainframe computer appear in neat columns in the upper register, each individual assigned a serial number by the machine. Below these outcomes, red and black color-coded soldiers, based on Csuri's drawing of the iconic 'little green army man,' are randomly cast onto a battlefield. They appear tossed about, as if floating in the minimalist, white ground plane. Their haphazard arrangement in the vacuous landscape contrasts effectively with their purposeful stance. People viewing the original *Random War* would recognize many of the soldiers' names; including Gerald Ford, Roy Lichtenstein, and Ronald Reagan; but, unlike Csuri, who directly experienced *Random War's* creation and random process when the mainframe computer printed the results in 1967, they would be left to interpret the results as a static art object.

Random War (2011) realizes Csuri's original 1967 intention — that people experience art as a real-time virtual event. He sought technology that could create a meaningful art object, which personalized the consequences of war. Csuri created a number of *Real Time Art Objects* between 1970 and 1974, many of which pushed the boundaries of art and technology and were funded by the National Science Foundation. However, his vision of *Random War* (1967) as an interactive art object is only being realized as he celebrates his 89th birthday. Using gaming software, Devin Moore and Wesley Adams have written a program that accesses any Facebook Friends' database. Moore and Adams stay true to the original work's aesthetic, carefully preserving *Random War's* (1967) forms and structures. They made raster copies of Csuri's 'army man' (originally rendered as a vector drawing) and tediously duplicated the original machine code-like font.

The online *Random War* (2011) is a thoughtfully made and skillfully programmed animated work that brings *Random War* (1967) to life. It is a dynamic unfolding that feels archaic and cutting-edge, timeless and immediate. It engages and creates suspense without gimmicks and gadgets. Most importantly, in front of a young woman sitting at her computer, it feels personal.

Charles A. Csuri is a traditionally trained artist who taught painting and drawing as a Professor at The Ohio State University for over twenty years. In his early forties, he began making art with a mainframe

computer and punch cards, launching a more than forty-year career as a computer artist. Today, Csuri is recognized as one of the most pioneering computer artists in the world, receiving the prestigious SIGGRAPH “Lifetime Achievement Award” in August 2011.

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Janice M. Glowski is an Assistant Professor of Art History and Religion at Wittenberg University, Springfield, OH. She has been studying and curating Charles Csuri's art since 1999, and is editor of the exhibition catalog Beyond Boundaries: Charles A. Csuri (1963 – present).

STRUCTURING SOMNOLENCE: SLEEP SCIENCE TECHNOLOGY AS A MEDIUM FOR DRAWING WITH THE BODY AT REST

Lisa Carrie Goldberg

In December 2010, three volunteers participated in a two-week sleep study conducted by artist Lisa Carrie Goldberg and administered by a certified sleep technician. It was through these nocturnal events that the process of employing the body and the mind during sleep as a means of art making was realised. This paper, therefore, will investigate the fields of sleep science and art.

INTRODUCTION

At present, there is no universally acknowledged definition of sleep. While the science of sleep remains nebulous, now is a time rich with possibilities for artistic intervention and interpretation. According to William C. Dement, a forefather of medical sleep science, the modern incarnation of the field was aided by advances in sleep science technologies and the availability of imaging tools to visualise the brain. [1] Through this advancement in technology, sleep appears more tangible, or at least more visible and more measurable, to researchers. Yet at present, while the production of technological devices is ever increasing, there still exists no unified definition of this corporeal state. In the Structuring Somnolence project, I was not concerned with categorising or labelling sleep. Rather, my investigation is a striving for the comprehension of sleep through various modes of observation and my interest lies in looking at how sleep is being perceived by science today.

The Structuring Somnolence project is an investigation into the points of intersection and commonalities between the fields of sleep science and art, drawing particular attention to the semantic and diagrammatic parallels between sleep science, art, architecture and infographics. Over two years of research, I have seen how aspects of contemporary sleep science warrant highlighting and probing. These aspects pertain to the sleep science's strong reliance on technology and quantification as a means of visualising 'truth' or 'optimum health' or 'disorder' in the endeavour to understand the phenomenon of sleep. A component of this research consisted of a performance event wherein three participants slept over in a sleep laboratory. This act helped to demystify the nocturnal facility by introducing foreign media and 'healthy,' 'non-disordered' sleepers into the space.

SLEEP AS REPRESENTED THROUGH SCIENCE

The study of sleep is a learned language. In its contemporary form, it is composed of an alphabet that can only be acquired and deciphered by an acutely trained eye. Therefore sleep is also an exclusive language. [2] The graphical interpretation of sleep seems to have become the sine qua non for professionals working in sleep research, linking symptom and diagnosis. It remains, at its core, a human-made device that may or may not completely and faithfully reflect the workings of sleep, much less its essence. Without the materialisation of an image either to prove or disprove medical predictions, technologists and clinicians would be hard pressed to find solutions for 'sleep-related issues' with any certitude.

The application of lines as inscription identifiers for sleep research has undergone many incarnations, with each technological development adding to the visual dictionary of sleep throughout history. In its

scientific qualification, sleep is given a written language consisting of a variety of expressive line drawings ranging in thickness, shape and colour – each feature corresponding algorithmically to a physiological process. This contrasts with painterly depictions of sleep, traditionally represented in the fine arts as a scene from a nightmare or as a body lying tranquilly supine, eyes shut and no movement.

In the sleep laboratory, when a patient makes a claim concerning a condition relating to his/her sleep, the claim may only become valid once a data image is produced. The lines in a sleep graph wield tremendous amounts of scientific credence. These lines represent the health of the subject as it pertains to sleep. There appears to be an almost unquestioning reliance on, and trust in, the machine. One aim of the Structuring Somnolence project was to debunk this notion. By constructing drawings with the body using sleep science technology, I bring about a rupture with its normal purpose and highlight the possibility that the computer or 'inscription device' [3] can lie; even when it seems to be all that meets the eye. Theorist Don Ihde makes reference to imaging technologies as 'truth-telling' devices, stating that they "carry this 'eyewitness' quality" and an "aura of seeing-believability." [4] This reliance on visualisations through a "framed space" [5] or "technological mediations," [6] reduces sleep research to an almost monosensory approach.

SLEEP AS A VISUAL LANGUAGE

The imagery and text in the Structuring Somnolence project play with semantic and diagrammatic appropriations across various disciplines. I am interested in the juncture at which seemingly opposite fields meet. The term 'sleep architecture' is commonly used by sleep researchers and technologists to describe a patient's period of sleep. Visually similar to that of a natural or built landscape, it reflects the stages of sleep and awakenings that take place across the night of a study. In the 1980s, Alexander A. Borbély depicted sleep patterns as diagrams, presenting the stages of sleep as the "Sleep Staircase" and REM as Doric columns. [7] Body positioning, as recorded in sleep also produces images that resembles structural landscapes. With this notion in mind, I felt compelled to explore the possibility that the science of sleep is malleable both in its definition and in the application of its designated technologies.

STRUCTURING SOMNOLENCE

In December 2010, I conducted a two-week performance study in collaboration with both SymbioticA, the art-science research laboratory and the Centre for Sleep Science at The University of Western Australia. I was aided by Stuart King, manager of the sleep centre, who was also the head technician for the entire series of performances.

As part of the experiment, three participant sleepers selected a copy of one architectural/landscape image that appealed to him or her in a significant way. Throughout the development of the project, the participants were made aware that together we were attempting to mirror this image through their body positioning in sleep. From the onset, it was explained to the participants, that this project was not about 'sleep hygiene,' sleep efficiency or even a good night's rest. In fact, I would be interfering with their sleep.

The participants were chosen based on their interest in sleep as well a confirmation that they had never been inside a sleep laboratory and had no identified sleep disorders. These volunteers were given the

rare opportunity to see documentation of their sleep in addition to having access into the inner, nocturnal workings of a sleep laboratory. For me, as the lead researcher and conductor of the studies, I was interested in finding participants who wanted to share in exploring and embracing the strangeness of sleep.

Each participant was required to sleepover in the laboratory over two nights. For their first night, the control experiment, the participants took part in a basic, standardised sleep study. This served not only as a baseline study for the entire experiment but also as an aid in familiarising the participant with the laboratory environment and protocol.

The second night, the Somnolence Structuring, involved my intervening with participants throughout the night. It was my responsibility to place the participant's body in a set positions that mimicked their chosen architectural/landscape image. The aim of this animation was two-fold. It was to have the participant's chosen image mirrored in the body position graph depicted within the computer software, which is conventionally used for measurement and diagnosis. At the same time, it would call upon the notion of sleep as an 'active state.' In addition, it would play upon the term 'sleep architecture' through architectural forms built by the body. The Contour Diagram was employed as a draft or map, which was used throughout the studies. It was a booklet comprising a series of structure outlines or contours superimposed on the participant's chosen image. I then plotted the timescale of the entire study, approximately 11:30 pm to 6:00 am, against their chosen image. This booklet was used as the template directing the repositioning of bodies through the night.

Once the participant was in his or her allocated room, electrodes were set in various positions on the body along with the sensor, which was placed on the chest. The electrodes indicated when the participants were asleep and their stage of sleep throughout the night. These sleep indicators included: Electroencephalogram (EEG) for brain waves, Electromyogram (EMG) for chin muscle movement and Electrooculogram (EOG) for eye movements. An Electrocardiogram (ECG) as a heart monitor and a Transducer belt as a breathing monitor were employed as a safety precaution. A body sensor, which was fastened to the Transducer belt that sat around the chest, was responsible for collecting data on the participant's various body positions during sleep. The sensor captured four types of body positions: right, back, left and front. Each position is represented as four coloured bars in the body position graph: red, blue, green and pink. In order to produce the artistic outcome of the experiment, each movement of the body was predetermined by a timescale that spanned the participants' entire sleep period throughout the performance study. This was outlined in the Contour Diagram.

SLEEP AS A FORCE TO BE RECKONED WITH

Much of this project has been about playing with invisible forces, whether they be the nature of sleep or our internal, intangible circadian rhythms. Recognising that sleep is a powerful force, I invariably experienced a sense of urgency when repositioning the bodies. This was because the body position sensor tracked and recorded every allocated posture it sensed every 30 seconds. Sometimes I was unable to move the body fast enough or, in a few instances, I had found repositioning difficult on account of resistance from the sleeper's body. Also, if the participant's body were to move of its own accord, which is a natural submission of the human body to sleep, I was responsible for gently restraining it and expeditiously repositioning it. This became a mediated guidance. On other occasions, the body position sensor

became loose on the belt. The result was a calculation configuring and recording of the ‘wrong’ body position, not the one planned and outlined in the sleeper’s Contour Diagram. Because of these features, my position and role within the room was crucial.

Technically speaking, if the body position sensor was placed in one position for more than 30 seconds, that position would be recorded on the sleep position graph. This then equated to a race against time, in that if the sensor was off kilter in some way, I had no more than 30 seconds to remedy the situation before it would be imprinted on the graph forever. And since one of the objectives of the studies was to create a replicated image of the participant’s chosen structure within the sleep graphs, every second – the equivalence of a line – counted. Working within this zone of urgency kept me alert and sustained my concentration throughout the night. Leaving a major factor of the project up to chance significantly aided my alertness and awareness, both of which were imperative in such a situation: struggling to stay awake, in a dark room, while watching someone sleep, throughout a night and into the early morning. What can be seen as the final product of each Somnolence Structuring is a graphic depicting coloured lines that match and those that do not. It is in these ‘happy mistakes,’ these moments of missing coordination, that the force of sleep is exemplified.

SLEEP ARCHITECTURE AS SOMNOLENCE STRUCTURING

The three architectural/landscape images chosen by the three different participants were the Parthenon, Monument Valley and the Perth city skyline. Each image had its own unique challenges and intricacies. Enacting the Parthenon involved an acute awareness of timing and a repetitive, simple motion. This consisted of only two moves, right and front, implemented precisely every half-hour for the entire night in order to give the shape and look of the iconic columns.

The vast expansiveness of Monument Valley, Utah, as enacted by the Somnolence Structuring, was translated into long stretches of time – periods of two hours occasionally – where no engagement with the sleeping body was required. And yet, in these lengthy durations were moments where alterations to positioning had to be conducted in precise 2–4 minute blocks of time. These motions were required for the final graph to reflect the intricate detail of the rocks silhouetted against the Utah sky.

The Perth city skyline is an image that most closely resembles that of ‘sleep architecture’ or a body position graph in its original form. Because most of the buildings on this horizon are flat rectangles, coordinating this structuring involved a relatively even balance of time spent positioning the body and time of non-engagement.

Along with observing sleep as an experience embodied within others, for me the Somnolence Structurings entailed comprehending sleep viscerally through a phenomenological approach. [8] Sleep, most often, just comes upon us, or over us; it sweeps through us. However, when it is taken away from us, it is, a form of a debilitation. Thus I come closest to understanding the essence of sleep when I deprive myself of it. The very lack – the very need – allows me to approach, as near as I now can, to grasping sleep, as that is when it visits us (while we are still in consciousness) in its most concrete and tangible incarnation. This could be said to be a universal experience, however, as long as we have not grasped its essence, its lack gives us a visceral experience and one way to attain a sense of it.

Rejecting notions of sleep as ‘an inactive state’ or ‘life’s little death,’ these body focused works became intimate engagements between artist and subject, who performed together while teetering between

transient states of consciousness – the artist being awake, tempted to sleep, and the participant asleep, waking slightly with every body reconfiguration. This duet emancipated the sleep laboratory bedroom from its purely scientific function.

Sleep, being outside conscious awareness, always escapes the observation of the sleeper. It can only ever be observed from without. There is a strong link between the impossibility of pinning down the lived experience of sleep and the unending variations and immense diversity in its representation within the arts. Like much art, Structuring Somnolence is playful as it is serious; it is a game played with nature in that I set up parameters and regulations as a sort of organisational tool or framework for the piece, knowing very well that in the end these will be ineffective as science and irrelevant to anything of a utilitarian nature. The act of carrying out an unconventional sleep study experiment as a performative artwork is, in and of itself, a reminder of the artificiality, the theatrical staging quality, of the sleep laboratory bedroom. With the data that emerged from the sleep technology commonly used to calculate and measure patient's sleep, together artist and participant forged a new configuration of graphics.

STRUCTURING SOMNOLENCE AT VISCERAL: THE LIVING ART EXPERIMENT

I was offered the opportunity to present my research at an exhibition entitled Visceral: The Living Art Experiment, which ran from January 25 to February 25 2011, held at Science Gallery at Trinity College in Dublin, Ireland. In essence, this rendering of Structuring Somnolence was similar to the experiments held in Perth: an all-night performance that produces certain outcomes – both intended and unintended — including a body position graph that mimics the outline of an architectural/landscape structure. As with the laboratory experiments, a volunteer sleeper and a sleep technician were required for this adapted version. On this occasion, variations to the experiment consisted of the environment in which it was situated and the technology used to conduct the study.

Structuring Somnolence at Visceral was an exercise that purposely invited unknowingness and happenstance. How would this live sleep event unfold amongst the myriad variables as a juxtaposition to the studies of the private, protectively encased sleep laboratory? Bedrooms specifically designed as sleep research facilities are crammed with technological apparatuses. However, with the advent of portable sleep measuring devices, also known as portable PSGs, it has become possible to gather data on a patient's sleep while that patient is removed from the laboratory setting by using Bluetooth wireless technology. The same technology was employed for this rendition of Structuring Somnolence.

This sleep study was to serve as a public performance event, a single nine-hour performance from January 28–29 2011, wherein people passing on the street became witnesses to the experiment taking place in real time, 9:00 pm to 6:00 am to be exact, only inches away from the glass façade of the Science Gallery. The portable PSG, was used to measure a basic electrode application set-up for a sleep study. In this gallery study, the participant sleeper chose to replicate the street block directly across from the Science Gallery. He liked the idea of mirroring what he saw and what he knew would be right beside him as he slept.

It was neither my main objective nor my main concern to wholly replicate the studies held at the Centre for Sleep Science inside Science Gallery. While the plan was to follow loosely the processes of conducting a sleep study with an artistic outcome, the concept behind Structuring Somnolence at Visceral, stemmed from a desire to see what would happen when we transported the sleep laboratory systematisation into an art space.

CONCLUSION: SOMETHING TO SLEEP ON

The investigation put forth by way of Structuring Somnolence was not to detract from the empirical values of science, but rather to highlight other ways of knowing and experiencing. Far from being a motionless and passive state, sleep has its own unique form of energy and dynamism. While scientific research has been among the ways of discovering this, one crucial role of art and my practice, is to defamiliarise all that we have named and categorised. This defamiliarisation serves as a reminder that sleep is a phenomenon, and that it is a lived, felt, forceful experience and one which can be expressed and interpreted in a multitude of ways.

The overriding demand to seek this 'truth' has led to evaluations carried out in artificial conditions (laboratories) with the subjects adorned in a plethora of clinical paraphernalia. As a way of approaching and addressing these matters anew, the development of this creative process focuses on harnessing the sleeping body as a means for drawing so as to repurpose sleep measuring and diagnostic devices for artistic gains.

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BUILDING COMPLEX REALITIES: ARTISTIC USES OF LOCATIVE MEDIA AND AUGMENTED REALITY

M. Luisa Gomez Martinez

This text intends to analyze the artistic uses of LM and AR systems as indexes and catalyst of a paradigm shift in the relations between real and virtual spaces. This paradigm, articulated around notions as mobility or hybridization and concreted in “augmented spaces”, is understood both as a result and materialization of the epistemological paradigm of complexity that regulates the social construction of reality since postmodernity.

Throughout the 20th century the artistic realm underwent a progressive transformation due to its increasing intersections with technology. This caused a redefinition of the artistic object’s aesthetic basis and its relation with the spectator, but also meant the multiplication of genres and typologies linked to the new production, visualization and communication devices. However, in the last three decades and due to the Internet’s expansion, the aesthetic boundaries of art have rapidly extended beyond its limits thanks to a whole new set of technologies related to the Internet and based on different types of information processing which, every time more infiltrated within the socio-cultural environment, fluctuate between everyday uses and artistic applications.

Thus, after the development of Net.Art and the improvement of the Virtual Reality (VR) systems in the 90s, we have witnessed – since the beginning of this century – the development of new artistic forms related with the Locative Media (LM) devices and the Augmented Reality (AR) systems, which in turn are frequently combined and closely related to the development of wireless interconnection networks.

Without focusing on the debates that question the aesthetic specificities of LM and AR or, especially in the case of LM, its status as an artistic avant-garde, we are interested in analyzing their “artistic uses” as indexes and catalyst of a possible paradigm shift in the relations between reality and virtuality, a role that can be played thanks to the reflexive and experimental way in which the artistic practices use the new technologies as creative tools, therefore expanding – at a phenomenological and imaginary level – its potential uses and interpretations. This change in paradigm is articulated around mobility, reterritorialization and hybridization of spaces, and, at an epistemological level, signifies overcoming a dual and exclusive model of reality to give way to a model based on integration, multidimensionality and complexity.

Comprised in the term LM are all those communication technologies which involve localization; that is, that “provide a link or information related to a specific place by means of GPS devices, mobile phones, PDA, as well as portable computers or wireless networks.” [1] On the other hand, the term AR alludes to a data visualization system that involves “the laying of dynamic and context-specific information over the visual field of a user.” [2]

One of the novelties of these systems – in comparison with the technologies used in Net.Art or the VR – is that they enable new mobility logics. While the traditional interfaces for accessing Cyberspace – computers or VR helmets – implied a total or relative physical immobility in relation to the terminal, the LM in general, as well as the smartphones and other AR visualization devices, allow information to be instantly accessed from a fully mobile position. Therefore, to our infinite capacity of virtual mobility

through the immaterial networks and information fluxes – which allowed us to virtually overcome the spatial-temporal barriers in communication – we must now add the capacity for actual mobility. Apart from entailing a considerable increase in the complexity of our perceptive experience, it allows us to control information in our surroundings (now constantly re-defined and implemented with virtual information) and transform our relations with the same. This new relation to information corresponds to what Lemos defined as ‘informative territories’: areas in which the information flow on the intersection between Cyberspace and urban space is digitally controlled. [3] This produces what Manovich defined as ‘Augmented Space’: “the physical space that is overlapped by dynamic and changing information.” [4]

These new interactions with our surroundings through the ‘augmented’ flow of information on reality and the ability to control it, imply new ways of inhabiting, occupying and experiencing physical space; they make up different reterritorialization strategies that seem to challenge the widespread notion in the 1990s that the emergence of a Cyberspace and the potential virtual ubiquity involved a process of deterritorialization of subjects and objects, weakening their relationships with the material space and leaving it practically obsolete. Although some authors like Haesbert have deeply questioned the deterritorialization concept, [5] the truth is that some artistic practices such as Net.Art, VR and all those based on Tele-presence, have contributed to establish within the social imaginary the logic of a progressive exclusion of real space in favor of a virtual space which – as pointed out by Castells – absorbed all our social and cultural logics. [6]

However, the reflections and experiences proposed by the artistic practices based on LM and AR point at the reterritorialization and hybridization of spaces. Far from focusing solely on virtual space and pushing physical space into the background, they reevaluate the latter as a place of action with a geographical location: they make us reconsider our relation with space, redefining it through new potential/virtual narratives and rebuilding it by means of new socio-cultural routines based on physical mobility. In this way, the LM (proposing new pathways and cartographies based on social action over the physical space) and the AR (introducing a new paradigm in regard to Cyberspace where virtual objects are rendered on the physical space) promote a logic of spatial hybridization that reflects, manifests and materializes the complexity of our current technologically mediated reality.

The project *WalkSpace: Beirut-Venice* by Connor McGarrigle, currently on view at the 54th Biennial Exhibition of Venice, exemplifies the abovementioned within the context of LM. The piece consists of a tour through the cities of Lebanon and Venice, interconnected with each other in such a way that the tour through Lebanon is guided from Venice and vice versa. As the artist himself points out:

“The object is not to create a finite discrete work but to create a peripatetic relational space which can evolve and respond to the situation, the desires of its participants and serendipity, with the work being created through the actions of its participants. The space is furthermore overlaid with a hybrid, networked space connecting both cities and augmenting each space with the absent presence of the other.” [7]

The virtual ‘pavilions’ exhibited at the Biennale make up another example of this new relational paradigm between virtuality and reality, in other words, of the ways in which the physical environment is transformed aesthetically and phenomenologically through virtual information. The official project *Invisible Pavilione*, commissioned by Simona Lodi and the extra official projects of the artistic group Manifest.AR, transform the venue’s empty spaces into new AR pavilions, even setting a refugee camp on St. Marco’s Square.

The presence of these projects at the Venice Biennale, but also at many other exhibition contexts during the last years, can be understood as an attempt to demonstrate the new artistic possibilities offered by these media – especially by AR, which aesthetic and critical potential have only recently started to be explored by art. But is also symptomatic of the expansion of a new model regarding space and reality.

In this model, what is real and what is virtual are no longer experienced as two opposed territories in constant tension, but rather, become flexible and osmotic. Whereas, until not so long ago, it was only possible to penetrate the virtual realm, these types of practices have caused virtual information to leak into reality, altering not only our relationship with space and its aesthetic forms, but also creating a new concept of reality based on the synthesis of both elements, leading to an augmented, complex, hybrid and multidimensional reality in which what is real, virtual, imaginary and symbolic become inseparable.

The epistemological paradigm of complexity being developed since the beginning of the 20th century – subsequently spurred by cybernetic and information system theories – and which seemed to reach its full philosophical expansion during postmodernity, is no longer an accurate metaphor to describe a new reality, but rather, through the visual and visualized information accessed ‘here and now’, becomes an aesthetical and phenomenological experience that adopts the shape of an ‘Augmented Space’.

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CHAMELEON: A STUDY OF EMPATHY

Tina Gonsalves

This paper will discuss *Chameleon*, an interdisciplinary video project exploring empathy and emotional contagion. *Chameleon*, shown at ISEA as part of the Australian Forum, is a six screen video installation, foregrounding emotional contagion and empathy. This paper will focus on the development of the cross cultural emotional expression video portrait database built for *Chameleon*.



Fig 1. Chameleon, installation view, Fabrica, Brighton, UK, 2009 (photo: Philip Carr)



Fig 2. Chameleon 7, installation view, RMIT Gallery, (as part of ANAT's Superhuman: Revolution of a species) Melbourne, Australia, 2009 (photo: Mark Ashkanasy)



Fig 3. Chameleon 6, installation view, Natural History Museum, (as part of After Darwin: Contemporary Expressions) London, UK, 2009 (photo: Natural History Museum)

Past work:

My work has always explored aspects of the intimacies and vulnerabilities of being human. In the past I have explored the emotional signatures of our bodies, using pulse, sweat, prosody and movement as agency for moving image interactive works that highlight the nuances of emotions and its importance in our lives. [1]

Universal Emotions and Cross Cultural Nuances.

When we feel emotions, they tell us something important about ourselves, our relationship with the world and our relationship with each other. The ability to read emotions in both others and ourselves is central to empathy and social understanding.

Researchers suggest that over eighty percent of human communication is encoded in emotion facial expression and body movements. In the 1960's Psychologist Paul Ekman traveled the world, from the USA to tribes in Papua New Guinea, showing pictures of facial emotion expressions to people. Following anthropologist Margaret Mead's theories, he had set out to establish the differences in emotion expression. To his surprise, he found more similarities in the way people express and understand emotions than differences. He concluded that the facial expressions of some emotions are not culturally determined, but universal across human cultures and thus biological in origin. He established that the five universal emotions that all cultures can read and respond to are fear, sadness, happiness, anger, and disgust. This research lead Ekman to develop the Facial Action Coding System (FACS), a system for deciphering which of the 43 muscles in the face are working to express emotions at any given moment. Using FACS lead to a verifiable database of facial expressions representing emotional states. This research revolutionized the study of emotions and although these images and research is now nearly forty years old, this verified database is still prominently used in most emotion neuroscience research today.

Within our own culture, the understanding of emotional expressions happens automatically and without much conscious awareness. We are highly attuned to subtle and covert emotional signals and people automatically and continuously synchronize with the facial expressions, voices, postures, movements of others. Through the dance of unconscious mimicry, we become carriers, infecting each other with our emotions, forging a bond with each other long before we utter a word, blending into the tone of our emotional environment. The face informs the self, not just others. One of Ekman's most fascinating findings is that if a person merely arranges his face into a certain expression, he will actually feel the corresponding emotion. This is the beginning of how we catch each other's emotions. Scientists call the mimicry of social situations the 'Chameleon Effect'.

However when we are taken out of our 'in-group', one discovers quickly that cultures do differ considerably in their use of emotional expression and cultural display rules vary about when, where, and how one should express emotions, how these emotions are experienced, the reactions they provoke and the way they are perceived. For example, research suggests it is Russians, closely followed by the Japanese and South Koreans, who most tightly control the display of their emotions, which may make Americans (who display the least control over their facial expressions) feel uncomfortable. In the West, we are more focused on the individual, with more attention to our own inner states and feelings, in the East one reads the emotions of a group with a lot more ease. As the complexity of our society broadens, when communicating, the overlay of cultural display rules can often get 'lost in translation', leading to a membrane of disconnects and negotiation.

Building Chameleon: An emotionally responsive video portrait project exploring empathy

With Chameleon, an aim was to investigate the social role played by the unspoken language of emotional expressions while exploring personal, technological and scientific biases and nuances.

To build *Chameleon*, we focused on three parts, the emotional code that triggered the video portraits was developed with neuroscientists Chris Frith, Hugo Critchley and Bruno Averbeck. The facial emotion reading technology that monitored the emotional expression of the audience was developed with affective computer scientist Rana El Kaliouby and Ros Picard at the MIT Media Lab. I directed the video database developed with everyday people sourced over the world. While developing *Chameleon's* code, the video database and interaction, we worked with Nadia Berthouze to analyze user experience. Working with curator Helen Sloan, we decided to take a more experimental and intuitive approach to exhibition, developing the work in nine progressions, turning each exhibiting experience into a 'lab'. We exhibited at a range of venues, including hospitals, museums and galleries.

Chameleon's emotional video portrait database:

Most scientists agree that we respond differently when we look at an image of a chair, and an image of a face. Intuitively I know when I see a face, I can feel my body shift, an awareness takes over my body. Science tells us that with the perception of faces, major activations occur in the brain particularly in the *fusiform gyri*. I was interested in creating a work that exploited our biological predisposition towards faces. [2]

I was interested in creating a new, more dynamic video database for emotion studies, and I hoped this could be of use for science. [3] It was important to shoot the work cross culturally to explore the cultural, social and individually determined responses to the six universal emotions being explored

in *Chameleon*. Faces are rich and varied, a brief glance of a face can provide us with knowledge to the individual's gender, their origin, their emotional state, their familiarity to us, their personality, their attractiveness or interest in us which in turn, influences our emotional response. I wanted to pick up on these nuances.

Over a year and a half, I set off over the world, asking volunteers to be filmed expressing emotions. Shoots often took place over weeks. The subjects were shot in a private studio space with a neutral black background, with simple lighting.

Technical considerations for the shoot

As a video artist, it was important to create *Chameleon's* video database using the medium of video. Although a 3D computer graphic rendered model of portraits would have been a much easier to create, easier to control, and more fluid, I was adamant that I wanted to document real people as part of the database. I was concerned about the 'uncanny valley' affect of 3D imagery. The theory holds that when renderings of people look and act almost like actual humans, they become overly "strange", thus will fail to evoke the empathic response I was looking for. At the beginning, I attempted to adhere to high production values using 3 HD cameras, large studios. I realized I needed to release this ideal and respond to the people I met everyday. I had my camera, a black sheet and made do with ad-hoc lighting so I could work with a range of people, in a range of spaces, in range of countries. I attempted a lot of continuity in post-production.

When creating the interactive design of *Chameleon*, it was integral to develop a novel interactive solution that matched both the conceptual and metaphoric content of emotional contagion. For a work about social emotions, it was an obvious choice to explore automatic facial emotion reading technology. It allowed for group interactivity, no training was needed with the audience and the monitoring of emotional state could happen from a distance, therefore a more fluid and seamless interaction loop could develop. Conceptually, interaction mode was delicate, provocative, and by analyzing the face, it was intimate. It also elicited awareness of these types of emotion recognitions technologies (both with fear and intrigue). We developed with the software with the MIT Media Lab (the software is called FaceSense). [4]

When designing the shoot, I was very aware that when the audience viewed the final video portraits, the emotional impact of the video portraits would need to trigger an unconscious emotional expression response in the viewer that the facial emotion expression technology needed to recognize.

Emotion Eliciting Techniques in the Studio

I elicited the emotional states using various techniques guided by my collaborators and others (psychologists, psycho-analysts, acting coaches, actors). For example, with disgust, I would ask the participants to view footage of people vomiting (that I had shot previously for a collaborative project about disgust). For surprise, I would talk calmly and then scream as loud as possible. For sadness and anger, I employed classical psychoanalytical techniques such as encouraging the volunteers to imagine different personal emotional scenarios from their past and to re-enact them as if in the present. I would often discuss personal emotional memories while shooting the participants facial emotion expression response to the stories. The studio time became a very intimate, vulnerable, trusting and often moving process for all involved. For a shoot to work, I learnt to listen attentively, subjects became friends.

Cross-cultural effects revealed themselves. One participant from Portugal displayed barely discernable emotions. North American participants were often the most vocally and facially expressive. Generally, participants from the UK had a harder time expressing anger. I wrote in my studio notes in March 2008 while working in Canada “...It’s taken a while to get comfortable asking people to evoke emotions. It’s been exhausting, because it feels so personal. It’s been a varied response, ranging from deep deep crying for half an hour to more laughter and very light expression..” Whereas my notes in April 2009, working in Paris “It’s harder to coax Parisians to reveal emotions... I need to spend more time getting to know participants, to develop a more trusting relationship. The studio time needs to be much longer than it was in Canada...”

On reflection, despite cultural differences, sadness was the easiest emotion to elicit. Most of the shoots resulted with the subjects in tears, sometimes deep crying lasting for up to an hour. I had to halt my intuitive response to step in front of the camera, to hug them, and make them feel better. I could only watch from behind the camera, and at most times, I ended up crying as well. After the shoot I asked the participants to reflect on the experience. “I felt messy and really really sorry for myself and very very lonely which made me feel even sorrier for myself... I felt like she (the artist) had been my therapist and that I owed her £50 for the session”. (email correspondence with artist August 2009)

I had developed a database of emotional expressions that were both felt and also acted. At first, I was on a ‘search’ for authentic, felt emotions, however, I soon realized that this was not important. In everyday we express emotions that are not ‘felt’, and their primary purpose may be some sort of manipulation. In everyday life, we seem to have an embodied awareness which drives a constant search of each others’ faces for truth. I also wanted this dynamic to evolve in *Chameleon*.

By the end of the project, I shot 30 participants, adding up to a 23-hour database of mostly non-verbal facial emotional expressions.

Post production

This material was treated carefully. Some footage was edited, as the footage would have been detrimental to the participants, as it was too private. Some footage was given back to the participants, to make their own works from. I edited the work by assigning in and outpoints for each emotion. I wrote in my blog in August, in Brighton 2009: “...I have built up compassion and attentiveness in the studio, I then have sat and analyzed and categorized that footage – more as looking at narrative and science of what an emotion is. This process has felt harsh – as if I am fragmenting a lovely relationship, objectifying it, making it into a production”.

Audience Response to Chameleon

The work was exhibited often, with most exhibition venues providing a chance to evaluate audience interaction. We tested a range of scenarios, with different types of screens (3D, low pixilation, High Definition, sculptural), displaying different portraits. We worked with the UCL Human Computers Interaction Center to evaluate the work.

Throughout the interviews of participants, feelings of intimacy came up repeatedly in the interviews although they were not explicitly part of the questions. In many cases the audience was affected by the emotions expressed by the characters, and the constant search for meaning and introduction of context

generally followed this. *"I was thinking of some sad things that happened to me, when [...the digital portrait] was sad for a while, it felt like a long time, and it reminded me of some things."* Also, *"I didn't like it when he looked sad and I didn't know why."*

A goal of the work was to bring up reflective questions about our own emotional expressions. *"I made a man start to scream, which was a little worrying - did I look like I needed to scream? Did I look frustrated? I then of course looked worried, which made someone else smile to make me feel better..."* Another reports that the lack of interaction had made one questions there own facial expression *"maybe I have got a tired face, umm... and sometimes when I am not smiling people say to me 'oh cheer up, as if your ... you know, maybe I do give that off instead of my feeling like I am emotionally upset or angry."*

Exciting Initial feedback suggests that the contagion of emotion leaks out of the gallery spaces. *"I went out afterwards and felt like I was picking up the feelings of everyone I passed."* My hope was that *Chameleon* reminds as that our body as a clear-cut distinction with the rest of the world is dissolved, revealing that we are all interconnected.

The Art and Science collaboration

Chameleon successfully brought together a genuine and rare collaboration across the boundaries of arts and science, creating art installations, research papers, and novel, more dynamic models for scientific research. I was very aware, in choosing the title *Chameleon*. It related to the project, but it also reflected my artistic role. As I collaborated, looking at my work through new lenses, I was moderating my language accordingly, depending on whom I was working with. My work was becoming a synthesis, influenced by the qualities of multiple collaborators, attempting to reach a balance that would meet the needs of each collaborator. I felt like a Chameleon, shifting, adapting, a 'changing self.'

The scientists involved in *Chameleon* reported feeling a sense of 'freedom': Chris Frith sees the cross disciplinary collaboration as liberating: *"This project has developed far beyond what I would dare to do in the carefully controlled experiments that we are restricted to. But the end result will provide us with marvelous tools for doing new experiments."* Nadia Berthouze writes: *"I see Chameleon as a source of ideas for the creation of digital environments conducive to patients becoming aware of their emotional states"*. Rosalind Picard, who is mentored the building of the face reading technology, is interested in its use for people with autism: *"As I watch people to learn from the interactions portrayed. These are scripts with naked emotion, uncovered, and whether ugly or beautiful, they are hard to turn the eyes from. Here is an engaging palate for helping people who don't naturally understand emotional interactions, and who want to deepen their ability to do so"*.

I would like to acknowledge the in kind support from the MIT Media Lab, Banff New Media Institute, SCAN, Fabrica and Institute of Neurology at UCL. The project is funded by the Wellcome Trust, Australian Network for Art and Technology Synapse Residency, Arts Council England, Lighthouse and the Australia Arts Council.

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1. <http://www.tinagonsalves.com>
2. *I had had an interest in dynamics of portraiture for years. In earlier work such as Feel: Trace (2005), and Feel: Ferment (2006), I had begun to explore the static facial emotion recognition databases most often used in emotion research such as the Ekman and Friesen Database, and the Karolinska database. In Feel: Insula (2007), I had begun the creation of a new moving image portraiture database that searched for a more authentic expression of emotion. Over a few months, I worked with clinical hypnotist, David Oakley, asking him to hypnotize me into different emotional states to create a more genuine representation of emotional expression. This became part of a video installation, and also the voice track for a short film, Feel: Melancholia (2007).*
3. *A large percentage of current scientific experiments exploring facial emotion expression uses Paul Ekman's 1970's visual database of static facial expressions representing emotional states. Since I finished the database in 2010, I have had quite a few requests for the database to be implemented in science studies.*
4. *Please visit <http://www.tinagonsalves.com/chamcatalogue.html> to download an interactive catalogue about Chameleon.*

ELICITING COMPASSION : AN ARTIST IN RESIDENCY AT THE MAX PLANCK INSTITUTE, LEIPZIG

Tina Gonsalves

This talk will discuss my residency (funded by the Australia Council's Inter Arts Board) based at the Max Planck Institute for Cognitive & Brain Science in Leipzig, a research center in Germany working with the director of the social neuroscience lab, Prof. Tania Singer. Singer's research area explores the role of trust, compassion and altruism in our lives.



Fig 1. Group photo of invited researchers at "The How to Cultivate Compassion Workshop 2011", Studio Olafur Eliasson, Berlin, Germany, July 2011, (Copyright: Max Planck Institute/Studio Olafur Eliasson).

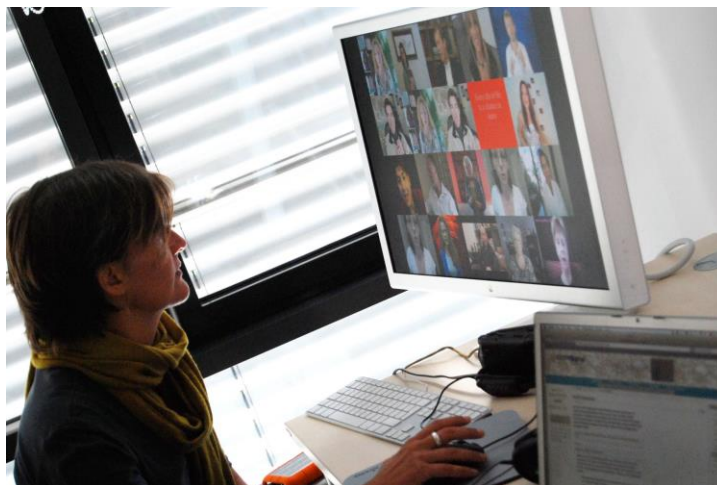


Fig 2. Tina Gonsalves working at the Max Planck Institute, Leipzig, Germany, August 2011 (Photo: Matthew Wild, copyright: Tina Gonsalves)



Fig 3. Tina Gonsalves testing "Percolate" which uses eye display technology developed by Nokia Research Center in Finland. The conversants look probingly into each others eyes as they converse, Nokia Research Center, Tampere, Finland. (Photo: Martin Schrader, copyright: Tina Gonsalves)

PROBING THE PSYCHO-PHYSICALITY OF EMOTION

As an artist, my work has always explored the emotional body through drawing, painting, collage, video and interactivity. I met Prof. Tania Singer, director of the Social Neuroscience lab at the Max Planck Institute for Cognitive and Brain Science in Leipzig, six years ago, when I was immersed in a year-long fellowship Arts Humanities Research Council/Arts Council England fellowship at the Institute of Cognitive Neuroscience (ICN) at University College London (UCL). I was at the ICN working with neuroscientist, Hugo Critchley whose research explores emotional psychophysiology, and Singer was part of Critchley's group.^[1] Singer was at the ICN working on some very interesting experiments exploring the effect that love has on empathy. At this time, Singer had just begun developing her interest in how meditation may impact the biology of the brain. Singer invited me to the initial meetings at the ICN with Matthieu Ricard, a Buddhist monk, French interpreter for the Dalai Lama and member of the Mind & Life Institute, an organization dedicated to collaborative research between scientists, Buddhist scholars and meditators on the effect of mind training and meditation on the brain. Singer began scanning Ricard's brain while he meditated in the fMRI scanner. I found it fascinating.

EXPLORING SOCIAL EMOTIONS

After my fellowship with Critchley, I began to work with social neuroscientist Chris Frith. Singer was part of both Critchley's and Frith's research groups. I initiated a residency at the Wellcome Department of Neuroimaging at UCL, working Frith. I was curious about how our sense of self arises from our need to map relations between self and others. Frith was discussing how a building block of human interaction is emotional contagion, the tendency to catch and feel emotions of others, so that we automatically mimic and synchronize with the vocalizations, postures, and movements, converging emotionally. Emotional

contagion can sow the seeds of empathy, as one then begins to identify with another's feelings. We embarked on a video project called *Chameleon*, exploring emotional contagion and empathy. Over nine prototypes, we worked with a range of research institutes to transform scientific, technical and visual theories of emotional transfer into poetic interactive installations driven by emotions of the audience and the portraits on the screen. Each day the mood of the *Chameleon* portraits adapt to the range of visitors' emotional expressions, affecting the tone and emotional ecology of the gallery space. I worked with a team of human computer interaction scientists to study audience experience. *Chameleon* was successful in exploring the concept of empathy and foregrounding emotions.

ELICITING COMPASSION

Chameleon lead me to contemplate ideas of compassion, and how it could be highlighted in the interaction scenarios of the work. Compassion is a complex state of being. Empathy explores the feelings of another. Compassion requires empathy, and it also requires a time investment, as one feels compelled to alleviate or reduce the suffering of another. The Dalai Lama discusses compassion in dialogue with Paul Ekman in their book 'Emotional Awareness: Overcoming the Obstacles to Psychological Balance and Compassion'. *"... It is translated as a sense of connectedness, a sense of endearment to others, where the idea is cultivating a state of mind that makes the sight of others' suffering unbearable to you. Cultivation of that is the crucial component of compassion. It is said that the stronger this sense of connectedness, the greater your feeling of unbearableness when you see others suffer. . . . When you reach that state of mind, then others are seen almost as an extension of yourself, as part of you."*

These thoughts lead me to contact Singer. Since our first meeting six years ago at the ICN, Singer, along with other renowned scientists, had been working with the Dalai Lama and his close circle exploring the biological effects of compassion meditation on the brain and body. I was intrigued by Science's interest in incorporating a more holistic approach to knowledge. I was also intrigued by Buddhism's interest in science *'offering powerful tools for understanding of compassion, revealing the interconnectedness of all life, and that such understanding provides an essential rationale for ethical behavior and the protection of the environment'*. (Dalai Lama)

In 2010 Singer was awarded a large European Research Council (ERC) grant to research "Plasticity of the Empathic Brain: Structural and Functional MRI Studies on the Effect of Empathy Training on the Human Brain and Prosocial Behavior". We decided that the time was right to begin a residency.

In September 2010, I began the journey to the Max Planck Institute in Leipzig, Germany, meeting with Singer, and her ever-growing team. Singers' approach is multi-method and interdisciplinary, combining techniques and paradigms from the fields of neuroscience, bio-psychology, economics and the arts. The ERC grant will encapsulate an ambitious longitudinal study, taking place over a twelve-month period (the initial starting date was March 2011). Up to 200 subjects will be recruited. The subjects will have little or no background in meditation techniques. Over a year, they will undertake compassion training, while partaking in everyday life. They will be monitored up to six key times over the year (fMRI scanning, pathology, self reporting). This is a leap beyond previous studies as most studies of compassion training usually take place over a shorter period. The training usually takes place in a 'retreat' type of environment and the subjects usually have some meditation background.

Over the study period, the group are investigating the degree to which short and long term affective and cognitive training can significantly induce functional and long-lasting structural neuronal changes in the brain and lead to pro-social behaviour. They are also looking to the hormonal, health-related, and behavioural changes.

As an experiment like this has never been done before, much time has been spent discussing approach. Over long meetings, protocol and ethics considerations get refined. We discuss the importance of appointing the appropriate teachers to administer the compassion training. My role has been to brainstorm how we can use technology to create 'compassion interventions' with in everyday environments. Each of the subjects will be given a mobile phone that will be both a reporting tool and a tool to elicit compassion. A secure web based 'meeting point' may stream meditations, hold each days learning activity and become a place to share stories of compassion. It may also hold questionnaires, options to upload comments and chat online with subjects.

In July 2011, Singer held the "How To Cultivate Compassion Workshop" to refine the protocols, teachings and ethics that will be implemented in the longitudinal study. The workshop was based at the Studio Olafur Eliasson in Berlin. Eliasson is an Icelandic contemporary artist known for sculptures and large-scale installation art, employing elemental materials such as light, water, and air temperature to enhance viewer experience. In 1995 he established the Studio Olafur Eliasson a laboratory for spatial research where he collaborates with scientists, artists, architects and engineers. Eliasson is working with Singer on a compassion based project from the 2012 Olympics. Over four days, a mix of neuroscientists, psychologists, psychotherapists, academics, Buddhist monks, artists and like-minded international researchers studying compassion gathered. The approach to this gathering was more experiential, less didactic. Powerpoint presentations, 'p' values, graphs and statistics were not high on the agenda. Instead the discussions about compassion moved into 'interventions', so each of the researchers can 'experience' the teachings. This was matched with macrobiotic vegan food and group meditations designed to elicit compassion. Throughout the 5 day meeting, I found myself crying often! Reflecting, many of the Scientists were walking around Eliasson's studio with red and swollen eyes, which resulted in a lot more discussion, hugs and also laughter. For all involved, it was a felt, compassionate learning experience. I find this multi-method approach of Singer's is intriguing and inspiring. Out of the workshop she gathered committed key advisors to help oversee the study.

To me, it seems Singer is also attempting to 'live' the study. When we discuss the study, she often speaks about it very personally and her words become emotional. She talks of meditating daily and often attending meditation retreats. Quite a few members of the group meditate each day. Before I arrived, Singer and her research group undertook an eight week Mindfulness-Based Stress Reduction (MBSR) program together. The course was developed Jon Kabat-Zinn, at the University of Massachusetts Medical Centre. He sees it as '*a way of learning to pay wise attention to whatever is happening in your life that allows you a greater sense of connection to your life inwardly and outwardly*'. The MBSR program started in 1979 and is now offered in over 200 medical centers, hospitals, and clinics around the world. The training teaches methods of stress-reduction and formal practices in mindfulness meditation, encouraging the development of greater compassion. The group reported that undertaking a course like this with work colleagues was enlightening, vulnerable and strange. However, it did lead to a lot of the key issues that the subjects will encounter when undertaking the longitudinal study: Attendance motivation, ethics, the importance of great and inspiring teachers, the importance of keeping the study secular, and deeper issues of trust and sharing.

CREATING COMPASSION INTERVENTIONS

My role here is viewed in many ways. Some researchers see art as a way of making the science more accessible, working well for public engagement. Others see it as the illustrations of concepts, communicating new ways of seeing, moving the science forward. I see my main role here is to influence the 'design' of the protocols. Artists often investigate ideas in different ways than scientists, allowing fresh perspectives. My knowledge in biosensors and creating 'emotive' video content, as well as my work with mobile technology and the web has influenced the structure and delivery of the protocols. I have been working on a range of video databases that may elicit feelings of calmness and altruism and anxiousness. Throughout the residency I have been holding 'compassion' interventions with in the lab and the other departments of the Max Planck Institute. One intervention created 'moments' of compassion, asking the researchers to define compassion, discuss personal memories where compassion was the primary feeling. Another explores how compassion renders itself on the face, asking the researchers to look at the video camera while mediating on compassion.. Another intervention explores a heightened awareness of time, inspired by Marina Abramovich *'The Artist is Present'*, and psychological studies, I asked participants to sit opposite me, as we sit and non verbally communicate for two minutes.

While at the Max Planck Institute the aim is to shift this research into *The Nowness Project*. This series aims to disrupt 'communication' technologies that have become embedded into our everyday social interaction, revolutionizing the way we share information and experiences to those close to us. In particular, I have been repurposing live chat, video conferencing such as skype, and social networking tools. I was interested in the idea *"We are more connected than ever, yet people report feeling lonelier and more isolated than ever"* (Cacioppo). By understanding more about compassion, I am hoping to embed compassion eliciting techniques into the coding /visualization/performance design/ interaction strategies of the work creating 'compassion interventions'. We are negotiating if and how we can implement these into the studies.

The first prototype we have been working on is *Present Perfect Continuous*. Audiences will download a chat programs/widgets to their own computer systems/phones. The objective is disruption: Audiences will have to rethink habitual communication response as the chat program will only allow them to talk in present tense.

The second prototype in production is called *Unravel*. It explores, via chat program interventions how language shapes our emotional feelings and how we make sense of the world around us. Objective is intimacy: The work will look to neuroscientific paradigms to probe the emotional content in text (rapid linguistic processing) aiming to recognize when emotions are expressed in text and then generate text with specified, more overt, expression of emotion eliciting questions.

The third prototype is called *Percolate*. It uses eye display technology developed by Nokia Research Center in Finland. As a phone call begins, a captured image of the conversants' eyes is transmitted to each conversant via the eye display technology. The conversants look probingly into each others eyes as they converse. The objective is to create new, more intimate communications by breaking down the usual social ritual of body space and cultural difference in gaze frequency and duration. At the Nokia Research Center, we conducted an explorative user study in a laboratory context with five pairs of users to understand their experiences with this system. The results show that this kind of mediated communication can cause a variety of experiences, such as "interesting", "surprising", "tranquil" or

“pleasantly strange”. Overall the user study suggested the full-screen display appears to create a more focused communication, and thus can help make the discussion more intimate and focused on the moment. We envision that a system like this could become a tool for deeper listening.

A fourth prototype is called *Take a Look Through My Eyes*. Research suggests that imagining yourself in ‘someone else’s shoes’ helps increase your empathy for their plight. This prototype reworks skype and eye display technology to transpose each other’s vision. First person viewpoint of video is taken through video attached on eye display. This is streamed to each of the conversants. The video facing the conversant’s eye is also captured. This is masked, for example, we can experience when each other blinked, stared, changed eye gaze. *Take a Look Through My Eyes* allows us to escape the confines of our own worldview, and allows them to see things from each other’s perspective – the beginning of empathy.

A fifth prototype *Ponder*, is an intervention that allows one to ponder on oneself. Most communication devices allow us to communicate with others. This communication device allows one to communicate with oneself – an intrapersonal communication. Glasses are repurposed with mirrors, so the wearer can only contemplate at him or herself.

A sixth prototype *Breath* is an application that sends out a sonic breath file to computers and phones at key times, as a small intervention to remind people of the present.

The Max Planck residency has provided a platform and a reflective space to conceptualize and produce projects, share ideas and knowledge while learning more about the themes that are essential to my work. The institute and Singer have been generous in supplying a private office, access to the building, researchers, all talks, and organizing access to an apartment in Leipzig. Although the actual study has been put back to 2012 (due to the logistics of housing new scanners, construction of new buildings, refining protocols), both Singer and myself are now investigating how I can spend more time in Leipzig to be involved with the actual study in 2012.

References and Notes:

Critchley's research in interoceptive awareness (consciousness of internal bodily state) was integral to my work. At the time, I needed to know more about the body's signatures of emotions: how to probe, entrain and monitor emotions to create emotionally responsive video installations, generating an awareness of the internal sensitivities of the body that we usually ignore. Together, we created Feel_Series (2005/06/07), a series of installations that responded to heart rate, sweat and movement. We also created a range of visual databases for use with in Critchley's scientific experiments to probe different emotional states.

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THE USE OF ANIMATION IN THE GENERATION AND DOCUMENTATION OF IDEAS IN SYSTEMS PAINTING

PAUL GOODFELLOW

This is a review of my personal application of animation techniques to analyze and document visual rules within in systems based approaches to painting. I describe my art process and how animation is used to document visual decision-making at each stage of the work's development. This process allows me to capture any deviation from the system. My interest is to document the intuitive decision making processes within a controlled environment



Figure 1, Berlin Walk, (Color Study detail), 2011, Paul Goodfellow, Digital Film



Figure 2, *Berlin Walk*, (Composition Study detail), 2011, Paul Goodfellow, Giclee print, 422mmx297mm



Figure 3, *Berlin Walk*, (Detail), 2011, Paul Goodfellow, Acrylic on canvas, 1600x1220mm

This paper will summarize the systems art making process of the author and how animation is used to generate ideas and document visual decision-making processes at all stages of the development of a piece of work. This paper is written in the first person, where it relates specifically to the authors personal experience and work.

As an artist with a systems background, I am interested in the borderland between systems based approaches to investigation and intuitive experimentation in art. In thematic terms I am interested in applying this to the areas of environment and place and how this can be experienced and interpreted as an artist in four-dimensional space and how this can be reduced to an essential representation in a painting.

SYSTEMS ART

Systems have been identified within most disciplines and in simple terms can be described as a set of integrated elements that form a coherent whole. Boulding noted that ‘a system is anything that is not in chaos. We could turn the pattern around and define a system as any structure that exhibits order and pattern.’ [1] Systems theory, as applied to art grew from a group of conceptual artists in the late 1960’s, such as Burham, Haacke and Sol-Lewitt who referenced Weiner’s Cybernetics, and Von Bertalanffy’s General System Theory in their writing and work. Their work was concept driven and organised by rules, and although referenced or incorporated technology made a distinction between their conceptual art and art-and-technology, (electronic art). Sol Lewitt’s noted the divergence between conceptually driven cybernetic work and technology driven work in his essay “Paragraphs of Conceptual Art” (1967). He described conceptual art as a quasi-mechanical process: “In conceptual art the idea of concept is the most important aspect of the work . . . [t]he idea becomes a machine that makes the art.” Whereas electronic art was in danger of being uncritically focused on the materials and the spectacle of technology. As Sol Lewitt’s stated “new materials are one of the great afflictions of contemporary art. . . . The danger is, I think, in making the physicality of the materials so important that it becomes the idea of the work (another kind of expressionism).” [2]

A key figure in Systems Art is the artist Hans Haacke. In 1971 he proposed a Guggenheim show in which a caged Mynah bird repeated the words ‘All systems go’. Haacke could not train the bird to repeat the phrase though, and the project was treated as a conceptual proposal. The suggestion in the title is that ultimately all systems are open, and subject to failure or uncontrollable external factors. In an earlier work, (Chickens Hatching, 1970), Haacke had created a controllable system that relied on a simple feedback system of lamps and thermostat to control the hatching of chicks. This contrasts with ‘All systems go’, as the later work relied upon a parameter that could not easily be moderated in a system; namely the bird talking. [3]

I am interested in the space between these two works. I am interested in controllable systems, and the limits of controllable systems. I am interested in the role of the artist, and whether the Mynah bird’s free will represents the free will of the artist to submit completely to a system, or even the viewer and their role in the wider distributed system.

BACKGROUND

I originally worked in development of Geographical Information Systems, (GIS), for environmental and development projects. I was drawn to the way complex physical and social systems were integrated, modeled and visualized spatially and temporally. In my research I was coming across spatial and temporal patterns and phenomena in the data that could not be explained by the defined system or model. I was finding visual patterns in the data through intuitive visual manipulation, (such as animating the data over time), that could not be readily explained by subject specialists. I did not understand how I could perceive patterns in the data, when the system could not support such a finding. Thus the system required constant revision to accommodate the new findings. Alternatively the limited models could be understood as offering a supportive framework to interrogate the data to a certain depth, but ultimately the last step required an intuitive leap of the imagination. It was this borderline between a well-defined system and the transgression of the system that fascinated me, and continues to fascinate me as an artist. How systems are revealed, revised, transgressed and fail.

WALKING AS AN ART SYSTEM

Collecting experience and information through walking is a personal attempt to bring the technological approach of spatial analysis in the forms of GIS and GPS along side the surrealist, aesthetic and impressionistic approach of visual art. This duality of objective and subjective is accommodated in the ideas of Psychogeography. The origins of Psychogeography can be traced back, primarily to Paris and to Charles Baudelaire's 1863 essay, *The Painter of Modern Life* in which he described the *Flâneur*, "a person who walks the city in order to experience it." [4] The first major written work by a *Flâneur* practitioner was the unfinished *The Arcades Projects* by Walter Benjamin in which he documents in great detail his walks and interactions in the former arcades of Paris. This idea of the passive urban stroller was transformed in the 1920's by the founder of surrealism André Breton who used the urban stroll as a positive tool to challenge perceptions of reality. Over time the perceived failure of Surrealism to reform society through these methods new, more explicitly political groups developed that played on surrealist ideas. The Situationist International, under the direction of Guy Debord did much to define Psychogeography as it is understood today. At the heart of Psychogeography was the aim of combining subjective and objective knowledge and studies and Debord attempted to resolve this inherent paradox in his 1958 book "Theory of the Dérive." [5]

On another level my work references environmental art and artists, such as Richard Long and Hamish Fulton. Long, for example, has based his routes on geometry, giving his walks structure and a self-contained composition. Thus he avoids any sense of ritual or potential narratives, such as the following of Ley Lines. He has also removed any historical associations from his paths, to concentrate on the geometry. He uses systems to keep his choices to the minimum, so the walks don't become a personal response to or expression of the landscape. In contrast my walks, although based on systems, (which can include geo-information, maps or socio-economic systems,) are a way of finding the point where I can transcend the system in both walking and mapping terms and express a deeper essence of the place, as articulated in Heidegger's conceptions of place and topology. [6]

On a practical level walking has been chosen as it is a direct way of experiencing a place qualitatively, and a useful way of capturing data quantitatively, due the relatively slow movement through space. A walk can be defined as an art system that produces outputs, which in turn is representative of both the environment and sense of place. The walks I make are a private performance that is recorded. The art work made from the walks are a culmination of organizing and interrogating the recorded information in

a systematic way, and then transcending this order to make controlled, but spontaneous decisions during the final making process.

METHODOLOGY

I take a walk and document the walk with digital cameras, and log the positional information with a GPS device. I use this as source material to make animations that map the walk through the duration of the film. I also attempt to reduce the walk to a single image by collapsing all the frames into one image. This is made into computer-generated images, drawings and paintings.

The work is based on a set of procedures for the collection, organization, and manipulation of the source material. The source films are re-played and manipulated in real-time through a set of systematic rules that are controlled through numerical ranges, and digital controllers, as you would a computer game. At this stage the work being created is a mix of programmed rules and variables that are being manipulated by the controller. It is therefore a piece of work that is contained within a rigid set of rules, albeit one that allows for a range of choices. Animation is crucial at each stage of the creative process and these will now be described in order.

Stage 1. Data collection using stop-motion animation

During a walk a time-lapse camera is worn on the chest. This automatically takes a photograph every 10 seconds, and a GPS logs the position. The geo-located images from the walk are turned into a stop-motion film.

Stage 2. Studies in color using real-time & procedural animation

Using a digital drawing tablet a continuous line is drawn over the film, directing the pen to sample colours and aspects of the photographs that interested me. The line produced is combination of sampled colours and sampled photographic details. In my other hand I controlled a set of midi sliders to control parameters such as sample size. This process requires a continuous line to be drawn for the duration of the film. See Figure 1.

Stage 3. Studies in composition using real-time & procedural animation

During this stage compositions can be generated in real-time through a combination of intuitive interaction with certain parameters using midi controllers, and procedurally controlled parameters that are driven by data, such as altitude. From this process several outputs can be derived. These include computer-generated prints, drawings based on paths taken from the GPS, (gpx), files and detailed studies for compositions. See Figure 2.

Stage 4. Painting development using projected animation

The real-time animations made at the composition stage are complete when I am happy with the composition. As this is recorded as a film I can scrub backwards and forwards through time to understand how the image has been constructed and use it as a guide for the construction of a painting. At this stage the animation is projected onto the canvas, and used as a frame of reference. The overall composition of the painting will be taken from the animation. Each new element appearing in the animation

denotes a new element for the painting. For each of these elements I need to make an explicit decision on the canvas; whether to use the 'design' from the animation or to make changes in terms of color, shape and position. The only factor that will not change is its relative layer of painting, as this equates to its position on the timeline. See Figure 3.

Stage 5. Capturing the painting process using stop-motion

During the painting process the canvas is photographed with a camera using remote control shutter control. This captures the addition, subtraction and alteration of each new element. Thereby capturing each painting decision that deviates from the animated version.

Painting is a modest way of fixing variables and glitches in material, that stands in opposition to the increasingly interconnected and ephemeral distributed system of commodified communication and consumption. Painting captures the spatial and the temporal, and all the decisions that have been made regarding the construction of the painting. It condenses time-based work or systems into a single frame. It allows the artist to take something temporal, held mentally and make it visible, non-linear and compositional. It is an antidote to technology, programming, and perfect closed systems, as it is a way of having closure, forcing commitment to the material world. Painting is time-dependent, the drying paint forces decisions within a certain time frame.

Stage 6. Post painting time-based analysis using compositing techniques

The final stage is to replay the real-time animation created at stage 3 and the stop-motion animation created at stage 5 simultaneously. Firstly these will be played adjacent to each other, and secondly they will be overlaid using compositing software. This will highlight the differences between the two works, and these differences can be extracted as a new film. In essence this Boolean operation will generate the difference between the two works, and make explicit where I made decisions that deviated from the system. I am interested in the boundaries between these systematic rules and the intuitive real-time decisions in these works. I am interested in mapping out the systematic, and highlighting the intuitive. A key question to explore in the future is whether there is a difference between decisions made in real-time on the computer in a structured environment, as compared to real-time decisions made in painting in a structured environment?

CONCLUSIONS

There is no such thing as a perfect closed system or model in the real world that perfectly reflects the phenomena it seeks to represent, as there will always be variables that you cannot account for. A system therefore can only be an approximate model of the real world. Likewise a systems-based approach to painting can only be an approximate model, and cannot explicitly encompass all the decisions a painter makes during the painting process.

Animation is used to document the systems methodology I employ at each stage of the creative process. It allows me to capture any deviation from the system; to map the randomness, and chaos. My primary interest is to document in a time-based way the intuitive decision making processes taking place within a controlled environment. Animation is an excellent method for such documentation. Ultimately I am interested to understand what this might say about the relationship between intuition, conscious and sub-consciousness decision-making in art.

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THE MATERIALITY OF DIGITAL UTOPIAS

Baruch Gottlieb

The citizen creator of the current age is advertised to be empowered of unprecedented means for transforming the world. This paper will attempt to evaluate the Utopianism of the digital age with reflection on the material circumstances of the hardware expected to realize it.

Can we see in the predilections of our hardware the concretion of the certain social priorities? Can such social priorities be said to invoke ethical models? And if both questions can be taken, can we then infer that ethical values are inscribed in our hardware? If the response to the last question is positive, as I would like to argue, we have a situation where the highly miniaturized, multiplied automated processes of the hardware that makes today's industrial reality run are perpetuating certain moral values, and that these moral values deserve discussion.

The materiality of our contemporary environment is the product of large, to varying degrees global processes involving the collaboration of myriad people, excavating, working, thinking, planning, moving the materials around until they have settled in the forms we can observe here today. The production of the contemporary surface requires collusion, as Bruno Latour put it "An object cannot come into existence if the ranges of interests around the project do not intersect." [1] these overlapping ranges of interests constitute society. Therefore there is a sociology, and an anthropology to the present and it is grounded in the past, and, going further I claim, the physical reality of contemporary objects are, materially inscribed with the social processes by which they were generated.

If our technology is ingrained with, and propagating, social and moral messages, it is important for artists and critics to inscribe themselves there. When Flusser said "true freedom is to turn the accident around and make something, which was very improbable necessary," [2] he was speaking of Dante writing his *Inferno*, how unlikely it was that he wrote it, and how it became historically necessary in retrospect. This is exactly the kind of retrospective necessity we need to generate today. We should not take what has happened (the accident) as necessary, but decide what unlikely thing we wish to have become necessary in future retrospect.

I would maintain that there is, at every moment, the possibility, even the propensity for technology to be different than it has been in the past. Technology, as a human product is the site of a battle for ideological hegemony, thus claims of its neutrality are politically spurious. We could, from today, have a very different world of technical effects and objects, engendering different world-views and sociabilities, if, or course, the "ranges of interests" of enough people involved would intersect to support enough divergent projects.

It would appear that our age is very well disposed to exploring alternative social modes. Instead we have a society which is profoundly conservative, prey to the least threat of insecurity, constantly assailed with threats of various kinds, air and water pollution, distant and immanent wars and terrorism, global environmental disaster, etc. The litany of dangers reformulated endlessly over the course of every day's news feed, engenders an atmosphere of insecurity which cows populations into submission to any

regime which promises to protect them. In other words, despite superficial technological advance, politically we are still living in the 1700s, if not the 1300s. This fact alone casts significant aspersions on the claim of the neutrality of technology.

Let us take, for example, design errors which caused the deaths of (according to the US Congress) [3] over six million people. A holocaust broke out in the late nineties when engineers at Apple, Nokia, and other electronics manufacturers determined to use tantalum in their circuit boards. Tantalum's unique heat-resistant and high-conducting properties allowed the next generation smartphones, games and laptops to be designed thinner and lighter. Nobody asked where these materials would come from. Wars broke out for control of mines in DRC and Zambia, and millions were killed. This was patently a design decision which went wrong. Is the design neutral? Obviously not.

In 2002 the European community decided to ban the use of lead in solder. The project was called ROHS, it came into full effect in 2006. Other, safer alternatives to poisonous lead, such as tin, were available, which would protect tens of thousands of electronics assemblers around the world. No-one asked about where the tin would come from.

World-wide transition to non-lead solder for electronics meant that massive and inexpensive new sources of tin would suddenly have to be found. [4] Suddenly a civil war sprung up in eastern Congo over cassiterite (tin ore) mines, [5] hundreds of thousands were raped and murdered as militias, and sections of national armies, often supported by multinational mining corporations battled for control of the mines. There will be no Nürnberg for the inadvertent bureaucratic criminals, who simply though ignorance generated mass slaughter.

Since the earliest days of our 200-year industrial revolution, and before, back through to our philosophical ancestors in the Greeks and Egyptians, we have a certain tolerance for collateral damage, human exploitation, slavery, indentured labour, in the interest of social progress. We need to see that cruelty as part of the pedigree of our indubitable technological and scientific accomplishments. My point is that we cannot plan, or even envisage a technical utopia that is conveyed on hardware created under intolerable conditions. I deny the neutrality of hardware as I assert its persistence as a record, an archive of the social conditions of its emergence. As Garcia & Sandler concluded in their article about whether human technological enhancement could help resolve social justice problems "We must fix social injustice, the technologies will not do it for us." [6]

The engineers and designers, after all, were just looking for a practical solution for a technical problem, how to get as much heat resistance and electrical efficiency in the smallest space possible. Their negligence can not be abstracted from their competence, we need to take a sociological/anthropologic view of these specialists and attend to what is motivating them to make the decision they did. Following from Latour, Johansen, [7] Trawick, [8] my own field research, and that of others, I claim that the decisions of the engineers were based on their immediate social needs inside their company, ethical concerns about any possible repercussions of their actions were not significantly considered. Their quest for status by having solved the design problem overruled their ethical skepticism. They hide whatever shame they have behind a simplistic notion of progress.

"The various manifestations of socialism destroyed both their peoples and their ecosystems, whereas the powers of the North and West have been able to save their peoples and some of their countrysides by destroying the rest of the world and reducing its peoples to abject poverty. Hence a double tragedy: the former socialist societies think they can solve both their problems by imitating the West; the West

thinks it has escaped both problems and believes it has lessons for others even as it leaves the Earth and its people to die. The West thinks it is the sole possessor of the clever trick that will allow it to keep on winning indefinitely, whereas it has perhaps already lost everything.” [9]

In this quote we have a good critique on how the convergence of political economic agendas between capitalist and former socialist nations after the fall of the Berlin wall was based not on reasonable evaluations and commitment to an empirically superior system, but on self-delusion and false advertising. Industrial globalized capitalism is just one of innumerable possible economic systems for the people of the world, yet it is presented teleologically as a foregone conclusion, meanwhile it requires permanent maintenance of an atmosphere of imminent doom and threat.

If the technicians at Apple or Nokia, (and all the other cellphone producers, and the computer chip producers and the game unit producers, they are all in it together) had been motivated to create technologies which were really beneficial for all humanity right now and not just factoring in the potential deleterious effects of their design decisions as collateral damage, necessary in the war for market dominance, we might have seen the emergence of numerous divergent alternative forms of technology, since the materials needed for the smartphones, video games and computers we have today would have come at too high a price. Technology is not neutral, its values are inscribed in its hardware.

Electronics company technicians could be encouraged to create design solutions which would somehow foster social renewal in the countries where they live, but they are not., instead with all values heavily weighted with concerns over profitability, they allocate general prosperity the role of the greater social good, and export the problematic effects of new, urgent and extreme industrial demand somewhere far away and unknown.

Marshall McLuhan, lauded as the great prophet of the electronic age, always declaimed that he made no prognosis, but rather simply observed what was already happening. New technologies, such as nanochemistry do not bring about any Kuhnian paradigm shift either in scientific practice or in society. "It has never happened that a lab has shut down as a paradigm change in Kuhn's sense occurred. No equipment was thrown out, no people (least of all the clerks who produce the required lab equipment) were fired. The Kuhnian denial of the cumulative growth of knowledge is mistaken with respect to the technical side of science" [10] (On the other hand, a lot of consumer products have become obsolete as they were planned to- on the level of production, techniques have remained the same, only the fashion changes.) The last technical revolution was the first one, starting with the Gutenberg press and the steam engine and exponentially since the photograph. Though we in the elite may experience it as a Motley (ein buntes Gemisch) [11] our age is fundamentally not post-modern but rather hyper modern, with century-old industrial processes still humming along inside, albeit miniaturized.

The period we live in is properly not called post-industrial, but hyper-industrial. The industrial paradigm has not been surpassed. The self-proclaimed revolutions in the sphere of communications still utterly depend on industrial infrastructure. The industrial reality hums imperceptibly on in the background, in factories on the edges of the cities and in the great networks of tankers on the oceans. All this and more are 'assumed prerequisites' for the 'advanced society' in which we exist.

That the electricity which glows this screen-full of hopeful emancipatory meritocratic rhetoric is generated by turbines which have to be built in highly hegemonic systems all the way down, is something I wish to integrate in these very words. We need an epistemology generated from this symbiosis of structure and freedom.

Industrial paradigms persist everywhere in the creation of the hardware on which we generate our software Utopias. Many have heard recently of the sweatshop conditions of Chinese workers who assemble the iPad, how are we to perceive a utopia built on such dispositive? Yes the aspirations of humankind are great, they are also palliatives, rationalizations and apologia for the enormous human sacrifice such aspirations have always required. And after all the sacrifice, how much closer are we to that ideal?

Here I must claim with David Bloor's conservative Wittgenstein that "we don't need the present to contain the future, it is sufficient that it contains the past," [12] the future will be generated out of what we do with our past, not how we prepare or postulate or plan future scenarios. An unprecedentedly variegated technological reality is ready to emerge, will it ever get a chance?

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DISCOMFORT DESIGN: CRITICAL REFLECTION THROUGH UNCOMFORTABLE PLAY

LINDSAY GRACE

Consider that uncomfortable moment in life when people discover a playful experience ceases to be worth playing. Just as an arm is broken on the playground, or a relationship can no longer be mended, there are explicit moments when art transgresses some unforeseen territory leaving us with fear of its potential. This paper explores the potential of taboo game design.



© Lindsay Grace 2011. Characters from Match, a Critical Gameplay computer game about matching races.

Introduction

Taboo is a construct that defines borders. It tells us where we can and cannot go. The social more is as much a looking glass to reflect on our values as it is a place to test our mettle. This paper seeks to explore how games offer unique critical experience through socially prohibited play. It simply seeks to discuss how play through taboo gameplay exposes that which we may not want to discuss. Taboo game experiences are more than just uncomfortable situations, they are opportunities in rhetoric. They punctuate an experience and offer opportunities for thoughtful reflection on social values.

Games are structured play, and it is their structure that reflects social value. The game of tag gives players two options, hunt or be hunted. So too, when designers of games construct play, they are defining a world and its options.

DEFINING TABOO AND THE MOMENT OF DISCOMFORT

Taboo is at its simplest, a strong social prohibition. It ranges from the distasteful to the unfathomable. The borders of the taboo are defined by social values which inevitably overlap, wax, wane and contradict themselves and the borders of those around them. They are somewhat like human emotion, as something clear to sense, but difficult to articulate beyond the tension of shame or ridicule (Browne 1984). It is as the old saying goes, people may not be able to define it, but they know it when they see

it. It is then appropriate that some of the most clear discussion of the taboo and its inherent ambiguity is provided by a text which declares itself as non-academic (Thody 1997), although written by an academic.

While taboo may not have a clear and fixed demarcation in cultural space, it is best defined by its attributes. Taboo is often ostracized and discomforting. When something is taboo, it is often put away, absconded with, or otherwise removed from a general experience. Almost upon release, taboo becomes fetishized or ridiculed (Browne 1984). As a result, taboo play is a very tricky area of research. While many people may have heard of the famed Custer's Revenge Atari 2600 Game (Hernández-Avila 2005), how many have played it? What prevents them from playing it? Is it the shame of seeking it, the fear of enjoyment or something even more dark?

The question of experience is exceedingly important. To know that something is taboo is to have taboo prescribed. To experience something taboo is to understand it. Designers of experience must understand, not merely be told. Likewise the power of taboo experiences are greatly reduced once they are reported instead of experienced. Returning to the example of Custer's Revenge, few people know much about the game's other experiences, only its taboo penultimate experience. This reduces the game from a complete experience to a caricature. One or two traits obscure all else. In so doing, we may even miss the most important element of the design – the moment of discomfort.

The moment of discomfort is the point at which play no longer feels right. It is like the rhetoric of speech. Players are lead down a path and follow intently when the experience is good. The moment of exceptionally high impact is when the player wants to follow, but fears what follows. It is even more impressive when that moment is of great conflict. Like the rhetoric of a powerful orator seeking to change your mind, the game may lead you in, have you nodding, and ultimately encourage you to agree to things you had not planned.

The moment of discomfort is the critical moment. It is the point where all things human meet. Players are at odds with their emotions, their social norms, their identity, and their understanding of what they believe is truth. Even the staunchest defendants of games as something outside of the everyday can reveal a moment when they have asked themselves if they should or should not be playing a certain way. This is the moment of discomfort. It is the moment when the player is brought back to the cerebral tension of reflection. It is the *wait a moment*, moment.

It is important to contextualize taboo and its moment of discomfort in a critical sense. It is not enough to ask why something is taboo. Instead, the important question is what about the moment of discomfort in taboo play makes it uncomfortable. Why does playing mean more than thinking? What actions in play drive the moment of discomfort and what borders of social appropriateness have been transgressed? It is also important to understand that the moment of discomfort is more than its moment. Just as a theatrical production or a political movement are more than just the few minutes of highlights, the moment of discomfort is a result of all game experiences within the subject game and the games that preceded it.

Sex and Recent History:

In the recent controversies of violence and video games in the United States Supreme Court one taboo reveals itself grandly. In the recent and widely publicized case involving the banning of violent games

sales to children, the majority opinion voiced by Justice Scalia indicate the dichotomy of sex and violence that are integral to American social norms. He writes “There is a critical difference, however, between obscenity laws and laws regulating violence in entertainment . . . obscenity had long been prohibited, see *Roth*, 354 U. S., at 484–485, and this experience had helped to shape certain generally accepted norms concerning expression related to sex. There is no similar history regarding expression related to violence.” (*Brown, Governor of California, et al. v. Entertainment Merchants Association et al.* 2011)

The fact that prohibition rests not in the malevolent destruction of another simulated being, but in the revealing of their natural parts or by participating in the act that created them is beyond telling. A game franchise such as *Grand Theft Auto* (Rock Star Games 1997) is not taboo in its acts of malice, but in its acts of giving pleasure. The game is arguably objectionable for its killing, but unsalable for a single act of sexual play, as evidenced by the prohibited sales of the then shocking hot coffee mod (DeVane and Squire 2008). The versions of the game sold with this programmed trap door, allowed players to unlock a portion of the game that afforded players the ability to simulate sexual intimacies with a non-player character. When discovered, hot-coffee mod containing versions of the software were pulled from retailer shelves. This was an enormous effort of prohibition.

On the continuum of distasteful to unfathomable, another commercial release sits neatly for American audiences. As the subject of more ridicule than objection, *BMX XXX* (Acclaim 2002) is a game that reveals that the moment of discomfort is not as simple as haphazardly grinding through taboo. The game is a fairly traditional, collection oriented extreme-sports title for off-road trick bikes. It rewards players by allowing them to see full motion video from the Scores chain of adult entertainment clubs. One reviewer put it succinctly, “aside from making the ‘groundbreaking’ move of featuring a lot of cursing and strippers, *BMX XXX* doesn’t do anything particularly well” (Gerstmann 2002).

What is most interesting here is that unlike *Grand Theft Auto*’s hot coffee mod, *BMX XXX* is not prohibited. While both games contain nudity, one must modify *Grand Theft Auto* to experience it. It is more likely that the moment of discomfort for *Grand Theft Auto* comes from its simulation. *BMX XXX* provides full motion, high fidelity images of sexual content in plain sight. *Grand Theft Auto* provides relatively low quality simulation of sexual acts. The moment of discomfort must then derive not from depiction, but from any variant of simulation. This is a distinct trait of games, as play is about acting, not merely watching.

Yet, the significance of simulation may not be that simple. Consider the *Dark Room Sex Game* (Collective 2009), which requires players to simulate sexual intercourse by shaking Wii remotes back and forth to rhythm. The game has no images, merely sound and motion. It is also, not generally subject to the same taboo response as *Grand Theft Auto*.

Grand Theft Auto’s moment of discomfort is largely about juxtaposition. Acts of violence repeatedly practiced, among a single sexual act is perhaps far more inciting than the act of simulation itself. This is important, as it indicates a much more complicated relationship to social discomfort. It is not merely that some Americans are uncomfortable with sexual simulations as play. It is that the juxtaposition of sex and violence is somehow taboo. Beyond that, it is the simulation of violence and the simulation of sex comingled that make taboo play. Other games that couple sexuality with violence, such as the *Dead or Alive 3* (Team Ninja 2002) tread in a much less taboo area.

Race and Historical Contexts

Juden Raus is an important historical game. It is not important for its mundane gameplay or mediocre design. It is important for its almost abysmal failure. It was an anti-Semitic game, so poorly designed that the Nazi SS audience purportedly rejected it (Morris-Friedman and Schädler 2003). It was considered too propagandist and in poor taste (Morris-Friedman and Schädler 2003).

The game, which roughly translates to Jew Out, requires players to move Jewish characters out of the city limits. For contemporary audiences, the entire scenario is taboo, yet for its audience, it was likewise dismissible. These types of games continue to illustrate the complications in constructing an effective moment of discomfort. It is not enough to be controversial. It is not enough to be bigoted. In the case of Juden Raus or BMX XXX, the designer does little to offer any type of rhetorical structure. Much of what needs to be known about the game is known in its first pitch. These games can be easily boiled down to moments of disrespect and cruel humor, while their experience is flatly structured. That is to say, the player learns nothing more from playing the game, than from hearing it. This is because if they play the game, they are not uncomfortable with its taboo. Or, if they are, there is also a part of them that wants to explore this taboo experience. Like fetish, they are lured by the experience and perhaps even seeking it.

This is an important aspect in constructing the moment of discomfort. While it is not wholly dependent on surprise, leading a player to a conclusion they did not expect is important. This is not a surprise, but it is an action in rhetoric. If properly constructed, a moment of discomfort is like well formed formal logic. If I as player enjoy A, and A implies B, why am I uncomfortable with B?

Ghettopoly (Chang 2003) is a game which touches a taboo topic in American culture. The game is a re-skinned Monopoly (Barbara 2007) based on the parodied experience of American ghettos. Railroads and community chests become gun shops and liquor stores. The game was sold in the popular Urban Outfitters chain, until political pressure removed it. It also resulted in an intellectual property lawsuit. Despite this chain of events, it's fundamentally unclear if the game really contains moments of discomfort. Players received much of what they expected. Simple attempts at humor at the expense of the misfortunes of ghetto life coupled with a pile of stereotype and racism.

The game and the ghetto it constructs are racial and economic. These are some of the United States' most sensitive topics. There are many spaces in race and economics that are fairly taboo for Americans. Yet, the game itself does not land squarely in social prohibition. Perhaps it is because Ghettopoly can be played at home, far away from the population it insults (Lardapide et al, 2010). The moment of discomfort for this game comes not from playing the game, but from where the game is played. Play the game on a city park bench in the middle of some of America's worst ghettos and the game is far more loaded with moments of discomfort. This is perhaps, why Juden Raus also failed. The moment of discomfort is as much about social space as it is designed experience.

Such claims are somewhat supported by the tension of Nazi paraphernalia for German audiences. As localization experts can attest, digital games for German audiences must remove Nazi allusion. This means turning the WWII Wolfenstein (Raven Software 2009) game into something other than a fight to kill Nazi soldiers. Here, the moment of discomfort is directly related to proximity - physical, historical, and social.

Social proximity is even more complicated when considering design source. While many players do not stop to ask who made the game they are playing, moments of discomfort, with their tension of reflection, drive players to these questions. Consider the board game *Life as a Blackman* (Sawyer, 1999). This game attempts to illustrate with a serious tone the complexities of achieving success as an African American male. The game was distributed by an independent publisher and developed by a young African American marketing professional. While it was never retailed at a chain like Urban Outfitters, it also never achieved the popularity of *Ghettopoly* nor the critical attention shared by similar games. Is it because a game by an African American, about African Americans lacks the tension of a game about African Americans by Taiwanese American, David Cheng (Ho and Mullen 2008)?

Given how infrequently players ask who designed a game, it may be that *Life as a Blackman* fails to be taboo enough to be fetishized? Unlike *Juden Raus*, *Life as a Blackman* had the support of some members of the African American community (Chadwick 2002). Unlike *Ghettopoly*, *Life as a Blackman* also did little to incite frustrations from insensitivity. Perhaps it is because the game was critical, but offered few moments of discomfort. The game instead, structures its rhetoric plainly and without tension. It does not say what is good or what is bad, it merely says what is. In doing so, it offers little opportunity for players to explore taboo around race. It is likely that *Life as a Blackman* is not uncomfortable because it asks players to explore no space we have not already explored. It asks players to think about many things, but it fails to create that jarring moment that forces critical thinking.

Conclusion

This reflection merely reveals the patterns in moments of discomfort. The important question still remains. What does a moment of discomfort do for critical reflection? The answer depends on the situation. Just as juxtaposition is a harmonic device in composition, or a rhetorical device in poetics, the moment of discomfort offers designers a highly effective opportunity to remind players to think. It is most powerful in its ability to rip a player from the rhythm of play into to the laboratory of thought. Like a child who falls off a bike, or the recipient of a great gift, the player is likely to ask – what happened? Sometimes the moment of discomfort will lead to positive revelations, other times they will be negative. It is most important to understand that it is an opportunity to effect players. It is an opportunity to exploit the rhetoric of play.

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UNDERSTANDING THE ART PRACTICE OF CRITICAL GAMEPLAY DESIGNS

LINDSAY GRACE

The paper explores the recent growth in critical gameplay, an application of critical design to the production of computer games. This paper outlines play pedagogy and game rhetoric, relating critical design practices to the creation of computer games. It attempts to explain the art practice of critical game design, providing a brief digital game history and identifying prominent creative works in this relatively new space.

Introduction

In the maturation of a field, nothing is more telling than the creation of its discontents. Critical Gameplay games are the logical next step in the extension of games into a mature expressive medium. Critical games are political, social, expressive and even philosophical in their address.

These games reflect an art practice that is both intellectual and visceral. It serves as an experiment, eliciting player response and seeking to understand why these alternative ways to play had not been demonstrated previously. Each of the games pursues a single hypothesis with resolved specificity. The games ask questions about player values, gameplay heuristics and how we find entertainment. It recognizes the democracy of play, understanding that people not only like to play differently, but that playing differently expands the potential of games as expressive entertainment.

In design practices, there is a simple dichotomy that can be used to fundamentally describe the difference between affirmative design and critical gameplay design. This dichotomy divides designs by depth and breadth. Design depth is the continued exploration of familiar experiences. Design depth is the improvement of continued experiences, either incremental or dramatic. Design breadth is the exploration of unfamiliar experiences. First designs of any product or experience tend to offer breadth, as they lightly explore a number of potentials. Later generation designs, seek deeper exploration of the same basic design concepts.

The trajectory of modern digital game design is largely rooted in deeper explorations of existing game verbs and mechanics (Fullerton, 2008). Under this model, comparatives evolve into superlatives. What was good gets a few models of better, and in time bests are created. Players do more shooting, or more jumping. If they are simulation games, designers may seek more realistic experiences in the pursuit of authenticity. A baseball game may incorporate a weather algorithm, or a car racing simulation may employ more complex physics. The central focus of this type of design is the continued affirmation of previous design decisions in an effort to make a better experience. This is the pattern of affirmative design (Dunne 2001).

The affirmative design model develops much like a plant grows. First an original experience sprouts into a full fledged game. Then subsequent designers employ algorithmic enhancements to that central concept, perhaps bifurcating one key notion or refactoring key elements like a fractal. The mechanics of moving through space move from 2D in Super Mario Brothers (Nintendo Creative 1985), to 3D in Super Mario 64 (Nintendo EAD 1996), and even add a 4th dimension (Blow 2008). It is often not until some element of a previous experience falls from these branches that a new and novel game rhizome evolves.

Consider the number of unexplored designs dismissed by employing this affirmative design model. The

decision tree for design begins with an assumption that what existed previously is worth continuing. Each car racing game, places the player in control of a car instead of the many other possibilities. Is it not equally possible to create an engaging play experience centered on maintaining the cars for another driver? Is it not possible to make an exciting experience where the player does not swing a bat or pitch a ball, but instead manipulates the weather algorithm to support their team?

Critical gameplay, analyzes, reflects and responds to affirmative design by demonstrating the possibility of play and interaction ignored by convention. It fills gaps, reminds players of other perspectives and engages imagination through a different practice in creativity.

If affirmative design is trajectory driven, Critical Gameplay is without trajectory. Critical gameplay is a practice in which players are asked to play differently. The goal of which is to expose players to experiences that highlight the relative absences in our daily gaming experiences.

Pedagogy and Rhetoric of Entertainment

To understand critical gameplay, one must understand how it intersects with pedagogy, entertainment and design practice.

Psychologists frequently identifying the value of play in delivering a safe space to practice skills and experiment (Millar 1968). In this framing, games are merely structured play spaces designed to meet specific goals. Where traditional games like Chess may analogize the battle field, playground games like tag may offer an opportunity to play both hunter and hunted (Crawford 1984). Digital play offers similar experiences. Digital games can simulate the experience of handling the soft suspension of a 1970's sedan or leading a squad of soldiers through a battlefield. The fundamental question for critical game research is what lessons are missing from the canon of gameplay experiences.

If games are inherently pedagogic, then there are several ways to investigate the lessons being taught. The first is to analyze common games, catalog the experience, and assess the lessons. This is the somewhat common practice of investigation into game content. It is well housed under the areas of game studies. Researchers seeking to understand violence in games, for example, have been actively involved in this type of cataloging research (Anderson 2004). The fundamental problem with this research is that it is highly content driven. It is inherently problematized by the act of mining content. Imagine the challenge of analyzing a literary canon by identifying the acts of violence in *The Lord of The Rings* (Tolkien 2004), *The Complete Works of Shakespeare* (Shakespeare 1996) and *Crime and Punishment* (Dostoyevsky and Gibian 1989).

Cataloging what exists does a better job of describing what is, than describing what is absent. If a person wants to add an addition to their house, it is nice to catalog the rooms they currently have, but it does nothing to speak toward the potential of the construction project. Cataloging is a retrospective activity, indicating what has been and is. If an addition is to be built, a person who understands the structures of homes and imagines the unrealized is hired. Building something new is not about cataloging; it is about knowing the catalog and realizing the new.

Another approach to investigating the lessons inherent in gameplay models is much more common among art and design. Instead of cataloging the experience and attempting to apply a scientific schema, artists and developers often create a collection of demonstrations. For critical games, these are functional experiences that not only highlight difference through contrast, they demonstrate other potentials. As literary authors or filmmakers, have previously exposed audiences to worlds they had forgotten how to imagine, game makers have the ability to re-imagine the way players play.

Secondly, while catalog approaches may provide exhaustive lists and somewhat compelling data, they often fail to offer solutions. Evidence merely reveals what exists, it does not provide resolutions. If we understand that games of violence are engaging, and we endeavor to inspire non-violent game play,

isn't it our responsibility to demonstrate how those non-violent games can work? More interestingly, if game design wants wider audiences, isn't it essential that wider play experiences be explored? Critical games are inherently pedagogic. They endeavor to teach by way of example.

For this reason, critical gameplay games are often not only pedagogic, they are also rhetorical. Critical gameplay games make an argument about what is engaging entertainment. They are often responsorial, calling upon a convention and then either exploiting the convention's own assumptions, or inverting them. At their best, they demonstrate the magic of creativity, turning a simple cardboard box into a spaceship. They do so, by converting what can seem like a stale set of experiences into something for which there is no precedent. Or, they can remind designers and players of the discarded potential they dismissed. Bugs are turned into play, like a tin can substitutes for a soccer ball. A pile of rubble becomes a play space again.

The lessons in critical gameplay may not necessarily be desirable, just as varied audiences find offense in conventional play. Yet, critical gameplay is by definition critical. It is self-aware. As an explorer generally knows which way they plan to head, critical designers are directed by something other than the current trajectory. Affirmative design follows the line of logic laid before it. Critical design, sets an uncharted target. Both design approaches may not always land where they expect, but they have distinct paths.

The Design Practice:

Like many revolutions, the impetus of critical design is born from gaming discontent and relative outsiders. If game design is understood as travel down a straight road, critical gameplay design is the scenic route. The designers of critical gameplay are not seeking to continue the trajectory; they are offering another way to get somewhere else.

These game designers are providing new paths and new vehicles for travel. If the fundamental unit of game design is the game verb, then these designers are most commonly investigating new verbs. Many independent game developers have offered alternative verbs, but what distinguished critical gameplay is that these game verbs critique game standards themselves. Instead of merely offering the ability to do something players have not done before, critical gameplay games reference existing game verbs as critique. They provide notable play moments, that are most novel to games players and least notable to people who don't play games. Just as an 8 sided die is novel to some, and a table top RPG standard to others, the experience of critical gameplay discerns the familiar and the unfamiliar.

In some cases, the most efficacious player of a critical gameplay game is one that has not been trained in conventional play. It is this situation, the benefit of unfamiliarity that highlights the pedagogic content of games and the potential power of critical gameplay. Where a good gamer is typically understood as one who knows all the conventions of games, this inversion of power is a central pivot in critical gameplay. Critical gameplay games may be games that are easier to play for non-gamers than gamers. There can be little better evidence of the pedagogy of games.

Like a good experiment, most critical gameplay games are very specific in their address. They do not attempt to change everything about the way players play, but instead, they seek one or two points of investigation. Instead they may begin by questioning everything, but they end with one specific question.

Early Critical Gameplay Games:

Like many historical first, defining the earliest critical gameplay games is problematic. It could be argued that Monopoly (Hasbro 1990) is an early significant critical gameplay. As a rhetorical game design, it is inherently designed to teach the travesty of landlordship (Orbanes 2006). However, this example fails to appropriately reconceptualize conventional play. All lesson-oriented games are not critical gameplay.

it is important to understand that true critical gameplay is not only different, it is pedagogic and self reflective.

The space of contemporary digital games is perhaps an easier place to begin to identify appropriate critical gameplay. It is easier because it rests on an established canon of traditional and digital play. It is also easier because of documented exploration. These designers explicitly identify their designs as critical, providing the ever essential artistic intention. Much the way the writers of the theater of the absurd appropriately contextualized their work with both intention and a contemporary lens (Esslin 2009). Digital games were moved toward critical gameplay when the work of groups like Molle Industria and Faber Ludens started their success as early as 2004. Molle Industria creates games that are socio-political. Games such as Faith Fighter (Molle Industria, Faith Fighter 2010), which re-contextualizes religious conflict into a classic fighting game, laid the foundation for critical game design. Interestingly the game is an inversion of critical game design. Instead of seeking to critique play, the game serves as a critique of the social-political patterns which in Molle Industria's terms, are game like (Molle Industria). The group continues to create a variety of games that fuel wonderful tensions between digital play experience and socio-political issues. The Molle Industria games are essentially social-critical experiences, not play-critical experiences.

The Brazilian group at Faber Ludens has also been engaged in design work that is both political and playful. Unlike Molle Industria, which often produces playful tensions, Faber Ludens creates somewhat discomforting interactions. The group investigates concept designs like the Lead Years, a student project which was envisioned as an opportunity to provide interactive contextualization of historical torture in Brazil (Faber Ludens 2009).

Both groups apply the medium as an opportunity to critique societal characteristics, which lays a foundation for players to understand the notion that critical gameplay critiques game characteristics. While many of these games are critical, they too are not critical of the way our society chooses to play. They are more commonly critical of socio-political practices and their likeness to games, than the practices of play as political rhetoric.

Digital Games in Critical Gameplay:

The earliest intended critical games were created by the author of this paper in an ongoing project called the Critical Gameplay project and by Mary Flanagan. Flanagan published a book entitled Critical Play (Flanagan 2009), in which she takes a game studies oriented approach to cataloging critical play experiences. One of Flanagan's most notable contributions to the design of critical gameplay is a Giant Joystick (Flanagan, Giant Joystick 2006). In this work Flanagan offers a new play experience by a simple manipulation of input. She creates an Atari Joystick so large that one player cannot control it by themselves. Instead, multiple players must cooperate and communicate to accomplish the general goals of common, existing games. This is critical game design more in hardware, than game design. Giant Joystick does an essential job of reminding players, theorists, and designers of untapped potential.

The Critical Gameplay project has visited Asia, Europe, and locations in North and South America. The current collection of eight games is well documented through varied conference proceedings and book chapters (Grace 2010). These games are at the heart of critical gameplay practice. A few of the games include:

- Wait: a game that rewards players for balancing seeing with acting
- Bang!: a game that allows the player to kill other players, but by killing them the player must endure a long interruptive experience which forces the player to review the fictive history of their victim.

- **Black/White:** A game that thwarts the common practice of stereotyping non-player characters by making threats and non-threats look the same, but act differently.

Recently a new breed of developers have begun incorporating critical gameplay practices into their designs. *One Chance* is a game by Awkward Silence (Awkward Silence Games 2010) that highlights and responds to the gameplay standard of multiple endings. The player has the opportunity to play this adventure game through the last few days of earth, but once players complete the game all options for other choices are eliminated. As the title suggests, there is but one chance to determine the game's resolution. It is this omission of second chances that is a direct critique of gameplay standards. If game design had taken a different trajectory, there would be nothing novel about committing players to a single resolution. Yet, it is this concept of only one chance that makes the game noteworthy.

Complimenting this experience is Zack Gage's *Lose/Lose*. As a self-declared art game, it endeavors to couple a play experience with real world consequence. When the player shoots an alien in the game, the game deletes a single, random file off of the host computer. If the player dies, the game deletes itself. It is this second property that strongly propels *Lose/Lose* (Gage 2009) into the critical game space. Most games have a pay to stay or learn to play algorithm. If player fails to learn and successfully employ the game verbs they are either subject to game end or required to deposit more money. Yet, *Lose/Lose* inverts this relationship by eliminating itself. Failing to play the game well, saves the player from harm. *One Chance* and *Lose/Lose* are obvious in their pursuit and not very subtle in their execution. They are big in their presentation, but small in continued potential. Other critical games offer more potential for scale and provide a deeper experience.

A House in California (Elliot 2010) is a nostalgic game. It is a game that is personal in its origin, but universal in its experience. Designed as a kind of homage to Roberta and Ken Williams' *Mystery House* (On-Line Systems 1980) the game becomes critical at its game verbs. If one evaluates the dominant verbs of typical text and point-click adventures, the verbs are highly physical. The players are asked to act upon the world by taking, leaving, attacking, and others. Elliot provides new verbs, in a standard list of look, remember, forget, play, learn and catch. Remember and forget are much like a cerebral take and leave. Learn is a deeper verb, offering something beyond remembering. These three verbs, remember, forget and learn are at the heart of this critical gameplay experience. Consider how few games have ever afforded the player these actions. Then consider the rarity of a verb which conceptually, but not ordinarily builds on the other. It is common to ask a player to punch then kick, but to punch through kicking (which is not the same as punching and kicking simultaneously) is rare. So the player is left with an important ambiguity. If I can remember and forget, what does it mean to learn? An even more important question also arises – why haven't other games employed these verbs?

The opportunity for critical play to make rhetorical claims has not gone unnoticed. *Arizona Justice* is a game designed (Social Activist Games 2010) as political rhetoric. The game is a fairly standard, small serious game about a political controversy in the United States. The game employs an aesthetic and similar mechanics of Nintendo Wii's *Mii Match* (Nintendo EAD 2006). However, it is designed to critique the expected nature of an Arizona state law allowing authorities to question people who look like they may be illegal immigrants. The player must determine which players are illegal immigrants as they parade down the screen. The game's primary game verb is ostensibly point and click to identify illegal immigrants. Yet, more careful analysis reveals that the game's verb is stereotype and discriminate. While immigrants in the game can be any color, immigrants in the game are disproportionately non-white. The player is encouraged toward clicking on non-white non-player characters, driving the player toward the patterns that the game critiques in opposition.

Critical gameplay design continues, although it is clearly in its infancy. It is the authors hope that game designers embrace its ability to expand the experiences of play and potential to impart new rhetoric.

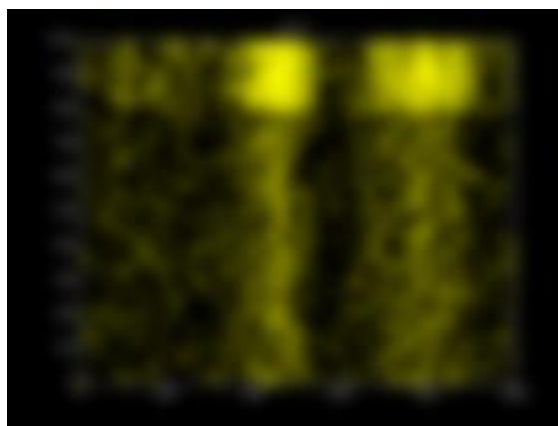
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NEURAL GHOSTS AND THE FOCUS OF ATTENTION

Jane Grant

In this paper I will discuss the phenomena of cortical sonic hallucination in conjunction with the new artwork *Ghost*.



Ghost, Raster Plot, Jane Grant, 2011.

Consciousness as attention to memory is a term that neuroscientist Eugene Izhikevich uses to describe a phenomenon in which the cortex re-lives or re-visits a specific pattern of neural activity in the absence of sensory information. The model brain or cortex, deprived of stimulation, journeys around its own temporal architectures conjuring past 'experiences' or 'memories', pulling them into the present. Evidence that these pathways continue to be re-visited once stimulation occurs again is compelling.

Referring to recent research in developing the sonic artwork *Ghost*, and an earlier work: *The Fragmented Orchestra*, all of which have at their core the Spike Neuronal Network model of Eugene Izhikevich, I will discuss the phenomena of 'sonic ghosts', a term I have used to describe the buffering up of the neural past within the neural present.

What we experience as consciousness occurs at many different cortical locations and timescales. In the paper 'Polychronization: Computation with Spikes', [1] Izhikevich discusses one of the simulated, anatomically realistic models of 100,000 cortical spiking neurons that he and his team have created. These networks of spiking neurons form polychronous (multiple or many times) groups, which fire with 'millisecond precision'. The connection strength between pairs and groups of neurons is intricately dependent upon the difference between spike arrival times, the phenomenon known as Spike Timing Dependent Plasticity (STDP). The groups of firing neurons are 'time locked but not synchronous' [1] and that it is the destination of the spiking and not the activation that gives rise to the complexity of the model. Izhikevich states that these time-based clusters or groups across the cortex, give rise to the beginning of 'simple thought and memory.'

These groups are interesting as they form as a result of STDP, not as a consequence of anatomical clustering, emerging from the 'dynamics of the connectivity between the neurons'. The polychronous

groups, because of this continual formation, grow and then disappear, although some 'live' and become more permanent in the neuronal model.

Izhikevich likens the network of polychronous groups to the immune system in which we appear to have antibodies for all possible antigens, 'even those that do not exist on earth'. He also proposes that these groups contain all possible variation of both thought that is, and thought that is to come – all potential manifestation of human cognition.

A major significance of polychronous groups is that they may represent memories or experience. The neuronal model becomes autonomous, self-activating once a certain threshold is achieved. The model devoid of any stimulation or articulate input generates random memories or experiences not associated with any previous input. The network has exceptional capacity for memory and it is this memory that is re-visited when external stimulus is not present. Once the network exceeds a particular threshold, an activation of groups occurs. These groups represent an external stimulus which go on to trigger other groups so that the number of internally stimulated groups are equivalent to the number of groups activated when externally stimulated. Izhikevich calls this 'the focus of attention.' [1] Therefore when external stimulus is not present, the neuronal model, driven by noisy currents, re-visits some of these firing clusters, following the formation of pathways previously established through external and internal stimulation. In a sense it could be said, that the cortex re-lives previous experiences.

"If the size of the network exceeds a certain threshold, a random activation of a few groups representing a previously seen stimulus may activate other groups representing the same stimulus so that the total number of activated groups is comparable to the number of activated groups that occurs when the stimulus is actually present and it is the focus of attention." [1]

"One can say that the network 'thinks' of the stimulus, that is, it pays attention to the memory of the stimulus. Such 'thinking' resembles 'experiencing' the stimulus. A sequence of spontaneous activations corresponding to one stimulus, then another, and so on may be related to the stream of primary (perceptual or sensory) consciousness." [1]

These streams of primary, perceptual and sensory consciousness are the temporal architectures of the brain, fleeting structures built of time. The structures are remarkable, as the neuronal firing events that the stimulus triggers remain, albeit temporarily, despite that they are no longer being physically, sensorially activated.

The aim of my research is to sonify the events that occur within the cortical structures. Their temporality and complexity are fascinating, in terms of time, the precise, but very fleeting nature of these events, are coupled with the exactitude of the millisecond. Furthermore, each firing event has the potential of infinite dimensionality, complexity in process, thought in the moment of becoming.

The Ganzfeld 'entire or total field' experiment sought to explore extra-sensory perception using mild sensory deprivation, white light and noise, in order to negate defined external stimulation. Regardless of the controversial findings in the field of parapsychology, what became apparent, was that the un-stimulated or sensorially deprived visual cortex begins to conjure vague images or impressions of scenes.

Age related macular degeneration consists of loss of vision occurring at the centre of the visual field. This lack of visual information causes blurred vision and eventually the loss of vision itself. In many

cases it also results in the phenomenon of hallucination ranging from mild to impressively articulate. These hallucinations are thought to be caused by the absence of continual visual information relayed from the retina through to the brain, the brain ‘filling in’ for the sensory information it lacks. In Ganzfeld, whilst every care is taken to deprive the brain of any stimulus; sound, vision and, of course, movement, the brain is never silent. Another more recent study in short-term sensory deprivation found that people not normally prone to hallucination experienced delusions and apparitions during the short period of deprivation. The researchers, from University College, London believe that the hallucinations are produced by a phenomenon called ‘faulty source monitoring;’ in that ‘the brain misidentifies the source of it’s own thoughts as arising outside the body.’ [2]

The brain, as we have seen from Izhikevich’s model, despite the stimulus being removed, creates its own activity, re-visits past experiences, pulling them into the context of the present.

In *Ghost*, eight speakers, eight microphones and a computer are connected to form a ‘memory embedded’ network of neurons. Sounds have been implanted into the cortex beforehand to provide the system with a buffer or ‘memory’. Once installed, live, ambient or performed sounds in the gallery will stimulate artificial neurons, modelled in the computer to fire, sending tiny fragments of sound from the eight microphones to the speakers. When these sounds fail to reach a certain threshold the cortex will journey around its own architecture, re-visiting older, established pathways, using its ‘memory’ as buoyancy when external stimulus dies away. This memory is its own internal noise, its earliest and primary stimulation. These sounds will be heard as ‘sonic ghosts,’ a term I have used to describe internal or endogenous noise embedded in the cortex, which reoccurs when the external stimulation is low or not present in the gallery space.

Ghost will reconfigure internal and external sounds causing a temporal and sonic overlapping of the neural past within the neural present, a rupture in the flow of sensory and endogenous information. As the external sonic events occur these will be drawn in to the cortex building an ever-increasing bed of experiences from which to compose.

One of the initial phases of this model was *The Fragmented Orchestra*, where groups of spiking neurons formed polychronous groups allowing a rich and dynamic model of firing activity in the cortex.

“*The Fragmented Orchestra* is a vast distributed sonic structure created by Jane Grant, John Matthias and Nick Ryan. It was installed in the United Kingdom between December 2008 and February 2009. It consisted of 24 fixed geographical locations, including FACT, Liverpool, University of Plymouth, Landscope Primary School, Devon, The National Portrait Gallery, London, Millennium Stadium, Cardiff and Kielder Observatory, Northumberland. At each of the locations, a ‘soundbox’ was installed, which consisted of a microphone, a small computer connected to the internet and a Feonic ‘drive’, a device that transmits audio through resonating architectural surfaces. Sound made in the spaces was transmitted across the internet to a server computer in the FACT gallery. In this computer, we ran an artificial neuronal network, an adaptation of the Izhikevich’s recently developed non-linear integrate and fire model that incorporates spatial ‘axonal delays’ between synapses and a spike-timing-dependent plasticity algorithm, which causes the synaptic strengths between neurons to become updated as a function of the differences in signal arrival times.” [3]

In *Ghost*, temporal and topological memories within the cortex, in conjunction with the phenomena of cortical, sonic hallucination are explored. Further research is needed to monitor the buffering up of the

neural past within the neural present in conjunction with STDP. A computer model that creates statistical data and visualization of what exactly is taking place will be developed over the coming year to explore what might be called the thickening of experience. The infinite complexity of how this cortex might perceive what we call experience is extraordinary, a folding in of external and internal articulation, double looped, networks of earlier stimulation extending into the now, sensory architectures building into an endogenous cortical construction of time, the 'sonic ghosts' being the hallucination that the audience hears in the absence of stimulation. It is the crossing of the threshold of the internal to the external and back again which translates milliseconds of neuronal activity into moments of sound dispersed across timescales and geographies and the minute spaces of the brain.

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MEDIA ART EXPLORES IMAGE HISTORIES: NEW TOOLS FOR OUR FIELD

Oliver Grau

The starting point of the following comparisons is the visual manifesto of knowledge, L'Academie des Sciences et des Beaux-Arts, Sebastien Le Clerc created in 1698; here is a print from the Göttweig Graphic Collection. L'Academie can be described as summa of the grand project of mathematizing nature as propagated by Descartes and Newton.

This digitization of a print, which can be magnified some sixteen thousand times, enables new access to the 'dead medium' of graphic prints and allows us to discover details that are barely recognizable in the original, for, to paraphrase Wölflin, "one only looks at for what one is able to see," in order to make new questions and answers possible.

Nested against a background of magnificent architecture, Le Clerc presents the grand spectrum of arts and sciences disciplines: mathematics, mechanics, physics, astronomy, music, anatomy, and philosophy are clearly recognizable. A great deal has been written about this work; I focus on the visual media, which commentators so far have ignored. Interestingly, today as we seek to understand the revolution concerning our visual perception, it is these visual media in Le Clerc's picture that have been picked up by artists.

When we zoom into the image, we see that Le Clerc's summa is also a collection of the optical media of his time, like in a burning mirror: the physiological basis of spatial vision is represented as well as central perspective, with which this drawing aid also refers to the vellum used by Dürer.

ANAMORPHOSIS

The anamorphosis, described by Lacan as the "reversal of central perspective," came to the West from China in the fifteenth century and subsequently developed into a variety of sub-techniques. Severely distorted objects could either be transformed into a recognisable image by using a cylindrical mirror or by viewing them from an acute angle. These images, which could only be experienced, so to speak, interACTIVELY could be regarded as precursors of today's processual images.

For years William Kentridge, one of the most known artists of our time, has been working around the subject of vision. Even historic image media, like the mirror anamorphosis, made its way into his contemporary media art. In 2007 he created a hybrid that had not existed before in the media history of seeing: using his eight minute short *What Will Come (Has Already Come)* he links a hand-drawn animation film with the anamorphosis, which appears connected now for the first time with moving images.

To get an accurate picture of what the distorted pictorial metaphors contain, Kentridge lets us use a metal cylindrical mirror: newsreel images of a colonial war Fascist Italy fought in 1935/1936 in Ethiopia. Kentridge, who comes from a South African Jewish family, fuses descriptions of the war with poetically

floating projections of memories to create a parable about violence — a revolving carousel of images like a visual maelstrom with the power to pull the observer in.

Kentridge gives us a bitter truth in a sugary pill: “Those who cannot remember the past are condemned to repeat it” (George Santayana), a pleasurable deception that we experience naively and at the same time knowingly. Kentridge’s video is not a film in terms of any time sequence, but rather a collage with, in part, hermetic elements, which overlap and are used by Kentridge as the vehicles of ambivalent, secret, even magical messages; perhaps inspired by Baltrusaitis’s description of the uses of anamorphosis in the course of history.

Kentridge, as we know, photographs different stages of his charcoal drawings for the animation, that is, he adds new details and erases others, working on the relatively small number of twenty to forty drawings per film, and what remains represents the final version of a scene — over a layer of drawings that have been re-worked several times. Kentridge expands the anamorphosis as a medium in two ways: firstly, he draws ‘distortedly’ with the aid of a cylindrical mirror after the classic manner of anamorphic depictions to obtain the desired proportions. Secondly, with his innovative crossing of anamorphosis and animation Kentridge also expands the possibilities of film: what Gunning claimed for Kentridge’s *Stereoskop* in 2001 — a “running metamorphosis” — is clearly ramped up in *What Will Come*. Kentridge not only succeeds in creating a space of distance and of thought through citing the historical anamorphosis; he also develops a media hybrid, which challenges the observer to become aware of their own active role in the production of images. In order to experience the complex, dynamic, and heterogeneous image space, the observer must become physically active — consequently, Kentridge exposes the iconicity of the image, if you like, which only arises through perception — in this case, in the anamorphic process.

It is not surprising that Kentridge develops his artistic approach in a time where the world of images around us is changing faster than ever before: images are advancing into new domains, to new private platforms like YouTube; Flickr, with its billions uploads; or Facebook, that has received his 700 millionth member and is now the largest image archive in the world. Television became a zappy field of thousands of channels; now in 3D — and 3D experiences as we know are having a renaissance in Cinema as well — here you see previous booms of 3D in cinema’s history. Large projection screens are invading our cities, buildings’ surfaces meld ever more often with moving images, so that the old dream of talking architecture gets a new arsenal of options; cell phones transmit movies in real time; and *Google StreetView* and *Google Earth* step up the concepts of panoramic image spaces including Satellite views, for example of our Center for Image Science in *Göttweig*.

All this, let’s say virtualization, requires a so far unknown material base: Google runs, for example, one million servers in a dozen of countries, even on the ocean, and processes twenty four Peta Byte of user generated data per day. The several million people who died in the race for conflict minerals — here you see a new one hundred Gigaheart IMB Graph Chip — did not even receive a monument of the unknown victim. Digital images became ubiquitous and key tools within the global reorganization of work, but these transformations have hit society to a large extent unprepared. I will not go deeper into that but some results of our research you can find in a newly published volume by MIT Press.

In our most recent present artists venture in a reflective manner towards new measurements of the complex status of seeing and creating images. Images' historical development between innovation, reflection and iconoclasm reaches in the 21st century a new level of global complexity. In the "mine of media history" and the history of image techniques new thinking spaces (Denkraum) are created through new interfaces, displays, hard- and software configurations, often engaging viewers in a form of playful, creative combination. The Media Arts landscape of recent years is being increasingly seized by a phenomenon which has yet not received any significant research, classification or analysis: the use of historic media configurations as an integrated part of contemporary media art installations. There are internationally renowned artists today who create optical experiments, panoramas, phantasmagoria, perspective theaters, camera obscura, anamorphoses, magic lanterns, etc. By reinterpreting old optical media they contextualize our digital image revolution, create distance and with that thinking spaces.

PEEP SHOW

Lynn Hershman provided us with an early glimpse in 1993 with *A Room of One's Own*, a voyeuristic, 'peep-show-like-look' into a miniature bedroom. Through a periscope at eye level on a large black box, the observer directs the progress of the installation interactively by eye movements, by the gaze. This set-up allows Hershman to use the installation, which connects the design of a modern-day sex peep-show with its historic forerunners; to interrogate forcefully the tense, even violent relationship between the female model depicted inside and the presumingly male observer looking in.

The contemporary peep-show, which unites illusion and the quick and furtive look, could perhaps stand for the male, but increasingly also the female, gazing at pornography on the Net; statistically the most frequent use of the Internet, but for academic cultural disciplines still by-and-large a taboo.

CAMERA OBSCURA

In a walk-in "Camera Obscura for Danube" on a cable ferry, installed in 2004 by Olafur Eliasson, passengers see the cultural landscape outside going past on large screens. Although looking like video displays, they employ no electronics whatsoever. At the centre of Eliasson's artistic intention are the users of the ferry, the observers who find themselves inside a machine for seeing that is also a time machine. We know that art and image history owes much to the camera obscura and since Crary there is no need to add anything further including the walk-in variety. Like the visitors at the fairs of yesteryear, the present-day passengers are amazed at how the images of the surroundings outside are generated and this fosters awareness of the Wachau cultural landscape and thus also the dimension of time. A long time aesthetically designed space becomes through Eliasson's modest, but highly precise, intervention acute.

PANORAMA

The panorama, the illusionistic medium par excellence, has enjoyed a revival in media art over the last twenty years in many installations. Here you see world wide exhibited art works from the early nineties by Maurice Benayoun, Michael Naimark, Luc Courchesne and Jeffrey Shaw and their teams; Shaw has been working for decades with immersion and has been using the term Panorama for about fifteen years now. Here, we have another recent interactive, real-time example featuring Melbourne, *Place-*

Urbanity. Users can explore fifteen panoramic scenes of different urban districts that are each home to a specific immigrant or ethnic community.

Whether consciously or unconsciously these artists, as we know today, all refer back to a historic ancestor in the history of art and the media: the 1787 patented panorama. Originally conceived as a new tool of visualization for military reconnaissance, Robert Barker's invention with its circular perspective soon became a mass medium that reached several hundred million people. In a manner reminiscent of modern fears of simulator sickness, the panorama was criticized around 1800 mainly for psychological reasons. It was argued that the illusion could result in an inability to perceive reality and the military leaders of France and England, Napoleon and Lord Nelson, soon realized the panorama's potential as a medium for propaganda.

The amalgamation of traditional Japanese culture – like Zen, Kabuki or Sensui ink painting – with the digital has for years been the goal of Kyoto based Professor Naoko Tosa. Here you see her *Interactive Zen Garden*, which makes us reflect on the comparison of Digital Culture with our traditions, so that conscious ZEN practice, the meditation reappears in contemporary culture – but her discourse between tradition and technology is now driving panoramas history into an unheard dimension. For the upcoming world EXPO 2012 in Korea, Tosa is planning to bring the lineage of huge impressive-immersive pavilions you find in most world fairs with the latest technology to a new level. Tosa's installation *Under Water Sansui with Four Gods* will transpose visitors into immersive 360° projections; a gigantic 250m long landscape wall-panorama, composed of projections of dynamic Sansui ink paintings, each measuring 20m high. Additionally, people walk under enormous flying dragons, which dominate the ceiling, consisting of a gigantic LED display, 23m wide and as long as 2 and a half football fields – imagine!

SHADOW PLAY

The enormous worldwide and especially European tradition of Shadow Play, has inspired Rafael Lozano-Hemmer, one of the most well-known contemporary artists. Indeed, Hemmer has written that he was inspired by Samuel van Hoogstraten's 1675 published *Shadow Dance*, from his book *Inleiding tot de Hogeschool der Schilderkunst*. For over a decade, Hemmer has created multifaceted versions of an interactive shadow theatre through a combination of the spatial relationships of visitors. Recently this development culminated in the installation *Sustained Coincidence - Subsculpture 8*, which forms overlapping shadows of the interactors by reactive light bulbs.

LATERNA MAGICA/PHANTASMAGORIA

In the case of the laterna magica, as I'm sure you know, we come to 'the' projection technology of the modern era, forerunner of cinematography, and — if you like — the video projector in this lecture hall which provides our images.

It is a remarkable fact that since the beginning of the new millennium the most extreme variant of the laterna magica is staging a comeback: the phantasmagoria, an image machine developed after the French Revolution, nowadays reflected by artists like Zoe Beloff, with her *Influencing Machine*; Rosângela Rennó, here with her 2004 *Experiencing Cinema*; Toni Oursler's *Influence Machine*; or works by Gary Hill or Laurie Anderson; all artists who do not have to fear competition with artists using

traditional art media, still preferred by the art market.

Not only that, but the Phantasmagoria has also reappeared in pop-culture; recent and spectacular examples are projections of ghosts in the Hollywood productions *The Magician* and *Inglourious Basterds*. In the latter, the freshly murdered owner of a Paris cinema – whose parents were also killed by the Nazis – appears in a burning cinema to the trapped people – all of them top Nazis – as a large projection; first on the cinema screen, then in the classic phantasmagoric manner on fire smoke, here as avenging angel.

A new variant of this media-art historic lineage was created in just the last few years by Jeffrey Shaw and Sarah Kenderdine with *UNMAKEABLELOVE* in their cybernetic theatre *Re-Actor*. *Re-Actor* is a real time augmented reality application using torch-interfaces to reveal a world of thirty humans, inspired by Samuel Beckett's *The Lost Ones*, though of course its allusions draw much wider to the human tragedies of the last century. Shaw himself mentions as an inspiration early cinema history, quote: “the myriad of extraordinary devices like the Lumiere Brothers Photorama, the Cyclorama, Cosmorama, Kineorama, Neorama, Uranorama [...]” etc. Here, they combine interaction not with a 3D humanoid but phantasmagoric figures, who seem to move in a dark space or even a prison camp formed by a hexagon of six rear-projected silver screens for passive stereo viewing. This results in the most powerful re-appearance of the phantasmagoria: a deprivation, maybe even an icon for we human’s in a WEB 2.0 world of 'connected isolation.'

Our Archives of Digital Art count many Media Art works, which are, for example, part of the history of immersion, a recently recognised phenomenon that can be traced through almost the entire history of art in the West. History has shown that there is cross-fertilization between large-scale spaces of illusion that fully integrate the human body (360° frescoes, the panorama, Stereopticon, Cinéorama, IMAX cinemas, or the CAVEs) and small-scale images positioned immediately in front of the eyes (peep-shows of the 17th century, stereoscopes, stereoscopic television, Sensorama, or HMDs).

CONCLUSION

Against the backdrop of the image revolution, today renowned artists are engaged in an ongoing endeavor to gauge the spectra of how images act as well as the continual transformation of how we see. Artists investigate how our gaze can be focused and concentrated, or diverted and dispersed; they analyze how we can be mesmerized, perhaps even ensnared, as well as how we can extricate ourselves from this clasp. Based on impulses from the history of perception, media artists today develop emancipatory strategies. This is in order to characterize how the gaze is constituted and to outline the inter-linked quantities of fiction and that which we call reality; between illusion and that which we could term 'pure seeing,' that acts in an enlightened and media-competent manner and exists at most as an abstract goal.

In the new millennium some of the important artifacts from the history of image machines are being mined for the artistic experiments of contemporary art: the magic lanterns and their offspring, the phantasmagorias, are being revived to produce magical, psychological, and eerie effects and atmosphere, and the wide open views of the vedute and panoramas are also making a comeback. Media artists frequently vary them, and reflect and recombine them in the interests of the viewer. The rectified images of the anamorphoses are again being used to convey political messages. What all these image machines have in common is that they are not being utilized for wistfully nostalgic historicism or for one

of the models of the evolution and advance of media development; rather, the artists are investigating the conditions and strategies of generating images and how these are perceived.

Reflection on art, on the aesthetic experience and the act of seeing in general, requires, as Cassirer, Warburg, Panofsky, Merleau Ponty and recently Hal Foster pointed out, DISTANCE. Often experimentally, the artists create new spaces for thought, not only to reflect on image media of the past, but more — it is to be hoped — on the circumstance that the fusion of digital technology with the apparatuses from art and media history will succeed in tracking down, arresting, and rendering comprehensible a piece of the present that has slipped from our grasp due to the distanced position we have taken up.

As we know, mass communication via audio-visual media is regarded as an achievement of the last century, yet the contemporary forms and formations are the result of complex historical processes that go back much further in time to the early modern age; already by the mid nineteenth century technologies, distribution methods, and configurations had developed that catered for mass audiences. Media Art, by definition, is, as we know, a relative term that has experienced transformation over time and currently counts digital media art as its newest representative. Today, film, cinema, and even television are regarded as 'old' media, because the image industries offer new media generations at ever shorter intervals — with the modern and post-modern eras quasi in the rear-view mirror. Although the dominant status of these media ensure that they are increasingly involved in creating collective 'reality' and are therefore rarely the subject of public inquiry or debate themselves, slowly but surely their supremacy is waning and the pre-history of the visual mass culture of the twentieth and twenty-first century is surfacing.

All this sounds like redefining images in their historical dimension and approaches of comparison, which go along with that, are based on the insight that images act diachronic, within a historical evolution and not function simply without reference. Image Science, or Bildwissenschaft, now allows us to write the history of the evolution of visual media, from peep-show to panorama, anamorphosis, stereoscope, magic lantern, films with odors and colours, cinéorama, IMAX, and the virtual image spaces of computers. It is, let me underscore, an evolution with breaks and detours; however, all its stages are distinguished by a relationship between art, science, image and media.

Let me now, in the second part, address elements of the development of media art research and scientific tool building our field needs.

We know that media artists today are shaping highly disparate areas, like time based installation art, telepresence art, genetic and bio art, robotics, Net Art, and space art; experimenting with nanotechnology, artificial or A-life art; creating virtual agents and avatars, mixed realities, and database-supported art. These artworks both represent and reflect the revolutionary development that the image has undergone over the past years.

Over the last forty years Media Art has evolved into a vivid contemporary factor, Digital Art became 'the art of our time' but has still 'not arrived' in the core cultural institutions of our societies. Although there are well attended festivals worldwide, funded collaborative projects, discussion forums and database documentation projects, Media Art is still rarely collected by museums, not supported within the main-frame of art history and nearly inaccessible for the non north-western public and their scholars.

Even if today Media Art, with its multifarious potential of expression and visualization, which thematizes

complex challenges of our societies like globalization, knowledge explosion, genetic engineering, ecological crises etc. quantitatively is dominating the art schools – Media Art is almost ignored by most museums, the acquisition and maintenance can still not compete with traditional art media. Thus, due to the fast changes in storage media, works that originated approximately ten years ago can normally not be shown anymore. It is no exaggeration to state that we face the TOTAL LOSS OF AN ART FORM from the early times of our postindustrial-digital societies.

Media Art therefore needs – as most of us know – as many bridges into our societies as possible: conferences, text repositories, database projects developing collective documentation and preservation strategies – new thesauri and new curricula for the next generation of teachers, artists and collectors.

Image Science and Media Studies help understand the function of today's image worlds in their importance for building and forming societies. With the history of illusion and immersion, the history of artificial life or the tradition of telepresence for example, Image Science offers sub-histories of the present image revolutions. Image Science, or Bildwissenschaft, is an open field that engages equally with what lies between the images and with the new perspectives resulting from interplay with neuroscience, psychology, philosophy, emotions research and other disciplines. Image Science might be considered as a reservoir in which contemporary processes are embedded, like an anthropologic narration, but as well the 'political battleground,' where the clash of images is analyzed.

Already in the 90s it became clear, that Media Art Research is spread over many disciplines and more and more the need became urgent to give it some common ground. That's why Media Art Histories held its first international Conference *Refresh*, for which I served as its chair. In 2005, through a collective process, involving thirty advisors and a dozen session chairs, co-ordinating meanwhile far more than a thousand papers, in co-operation with Leonardo and New Media Centre, *Refresh* represented the wide array of nineteen disciplines involved in the rapidly emerging field of Media Art Histories – some of the results you can find in an anthology from MIT Press. The good news is, through the success of *re:place* 2007, in Berlin's House of World Cultures, the conference series could be established, so that after Melbourne 2009, Liverpool later in September and Riga 2013 are on their way – so you are invited to show up there too.

Building Bridges for Media Art means also to further the establishment of new curricula, as we developed the first international Master of Arts in Media Art Histories – with faculty members like Erkki Huh-tamo, Lev Manovich, Christiane Paul and Sean Cubitt – which deals also with the practice and expertise in Curation, Collecting, Preserving and Archiving of Media Arts. It's a Masters for media art's working professionals, the average student is thirty five years old and they come now from five continents; in the meantime a Facebook forum with more than 2900 members also exists.

The field of Media Art Histories, which overlaps with image science, examines the sub-histories of media art: paradigms like artificial life/Automata or telepresence, the history of panoramic perception and it's knowledge with the related history of immersion and the history of projection for example. So, the method of comparison, which is based on the insight that images act diachronic (but not teleological) within a historical evolution –with detours and contradictions, in the sense of Gould, but never, as Warburg pointed out, function without reference – is a central pre-condition to deal with media art. Image science is based on three pre-conditions: 1. definition of the object, 2. setup of an image archive and 3. familiarity with a large quantity of images. Analogies or fundamental innovations in contemporary phenomena can be discerned through historical comparison, allowing us to differentiate and to distance

ourselves from the phenomenon, so archives became again an integral element in Media Art Research and Image Science.

We know that Darwin's work *The Expression of the Emotions* inspired Warburg's *Mnemosyne* image atlas of 1929, which remained a fragment. The Atlas tracks image citations of individual poses and forms across media and, most significantly, independent from the level of art niveau or genre. We may even say, that Warburg redefined art history as medial bridge building by including many forms of images.

Although taking a different approach, the history of image databases should also mention André Malreaux with his *museé imaginaire*. Now, we are witnessing the birth of the virtual museum as a key project for the Digital Humanities.

But let us watch for a moment beyond the Humanities.

In the natural sciences during the last decade large collective projects could address new research goals as in Astronomy, the 'Virtual Observatory' compiles centuries worth of celestial observations; global warming is understood with projects like the Millenium Ecosystem Assessment, at a detail never before calculable, and the Human Genome Project has already become legend. So far, unknown collective, international and sustainable structures enable science to give answers to complex problems.

Comparable with natural sciences, digital media and networked research catapult the humanities within reach of new and essential research tools. Linux and Wikipedia might be seen as a glimpse what can be possible, and what we need are collective documentation and preservation tools for media art, or, even better tools, which can manage an entire history of visual media and their human reception by means of thousands of sources. These themes and needs express, in regard to image revolution, key questions for the humanities today.

In 1999 we established at Humboldt University the first online media art documentation, the Database of Virtual Art. As pioneer, it has been documenting – in cooperation with renowned media artists, researchers and institutions – the last decades of digital installation art, as a collective open source project. Since today's digital artworks are processual, ephemeral, interactive, multimedial, and fundamentally context dependent, because of their different structure, they required a modified, we called it an "expanded concept of documentation."

As probably the most complex media art resource available online with several thousand documents and their technical data, more than two thousand listed articles and a survey of seven hundred and fifty institutions of media art, the database became a platform for information and communication. The system allows artists and experts to upload their information and the DVA relies on its advisory board represented by Christiane Paul, Roy Ascott or Jorge La Ferla. Let me clarify that the DVA represents the scientific selection of approximately five hundred artists of approximately five thousand evaluated artists. The policy, whether an artist is qualified to become a member, is, "the number of exhibitions, publications (at least five), awards and public presentations; we also ascribe high importance to artistic inventions like innovative interfaces, displays or software."

The main challenge that existed, and still exists, during the last fifteen years is the establishment, maintenance and advancement of the social corpus, consisting of hundreds of living individuals: artists, whose affiliation is not automatically assumed since the DVA is not defined like other projects, who focus on a festival or a collection.

In addition to searches of themes, Media Art documentation should also admit questions of gender, track the movement of technical staff from lab to lab, technical inventions pertaining to art, the destinations of public and private funds allocated to research. The hybrid character of media art requires a shift of the paradigm towards an orientation of process and context recording, which includes more and more the capture of the audience experience. Media Art documentation becomes a resource that facilitates research on the artists and their work for students and academics, who, it is hoped – now in a new Facebook-like communication structure – will contribute to expanding and updating the information. In this way, documentation changes from a one-way archiving of key data to a proactive process of knowledge transfer.

Now, together with an important unknown art collection, the Göttweig print collection, representing 30 thousand prints emphasizing Renaissance and Baroque works and a library of 150,000 volumes going back to the 9th century, like the Sankt Gallen Codex, the Database of Virtual Art strives to achieve the goal of a deeper media art historical cross pollination. Reaching to the present day, the print collection has grown to be the largest private collection of historical graphic art in Austria. Just as the Media Art Histories conference series bridges a gap, the combination of the two and other databases hopes to enable further historic references and impulses. The collection also contains proofs of the history of optical image media, intercultural concepts, caricatures, illustrations of landscapes in panoramic illustrations. For the future, this may provide resources for a broader analysis of media art.

The collection is being made public and researched through four strategies:

- a.) The 'Scientific Facsimile': Our Digitization Center digitizes with up to 72 million pixels. The detailed digitization of this beautiful hand of a colleague seems already a bit impolite.
- b.) The concept of Virtual Exhibitions (now adopted by main museums) addresses, since 2006, the public with online exhibitions like *Venetian Views*. Virtual exhibitions are divided into sub themes and enriched with different picture formats, literature and meta data.
- c.) Cinema Screen sized projections, give new access to details. Digitized prints can be connected in filmic fly-throughs allowing travel through time and space.
- d.) Fortunately, we have the unique situation to have the large media art archive next to a historic art collection: the Collection will be further networked with archives of contemporary media art via keywording.

Of course, you know that keywording can be bridge building too! The hierarchical Thesaurus of the DVA constitutes an approach to systemize the field of Digital Art: out of the Getty Arts & Architecture Thesaurus and the subject catalogue of the Warburg Library in London, keywords were selected which also have relevance in media art. On the other side, out of the most common used terms from media festivals like Ars Electronica, ISEA, Transmediale etc., new keywords were empirically selected. Important innovations such as 'interface' or 'genetic art' have been considered as well as keywords that play a role in traditional arts such as 'body', 'landscape' or 'illusion' and thus have a bridge-building function. It was important to limit the number to approximately three hundred and fifty words so that members of the database can assign, use, and keyword their works without great study of a too complex index. The categories led to natural overlapping, so that the hybrid artworks can be captured through clustering. Important for us was the thematical usability for the humanities: we wanted to avoid something only new, separated from our cultural history.

Let me finish with remarks on the challenging and serious situation of media art research today. With the DVA involved in the field of media art tool development from its beginning, we witnessed the crisis of documentation during the last few years. Since the foundation of the *Database of Virtual Art* (1999 – 2011 and ongoing), a number of online archives have arisen: *Langlois Foundation* in Montreal (1999 – 2008), *Netzspannung* at the Fraunhofer Institute (2001 – 2004), or *MedienKunstNetz* at ZKM (2004 – 2006), the *Boltzmann Institute for Media Art Research* in Linz (2005 – 2009). All these major projects of the field terminated, their funding expired, or they lost key researchers, like V2 in Rotterdam (2001 – ongoing). In this way, the originated scientific archives, which more and more often represent the only remaining contextualized image source of the works, do not only lose their significance for research and preservation, but in the meantime partly disappear from the web. Not only the media art itself, but also its scientific documentation fades, meaning that future generations will not be able to get an idea of the art of our time. Even the Europeana, a large but under-funded project for Europe-wide networks of digital collection documentation is rendered meaningless if the foundation, the archives themselves, are not continued. To put it another way: till now no sustainable strategy exists. If we take a look on media art research over the last 15 years then it is clear: what we need is a concentration of high quality scholarly documentation as well as a huge expansion of strength and initiative. 1.) In the field of documentation – systematic preservation campaigns do not exist so far – it is essential to unite the most important lessons learned and strategies developed by initiatives either existing or abandoned under the single roof of an international institution, that can guarantee persistent existence, such as the Library of Congress or an equivalent European or Asian institution. It would need to be supported with adequate expertise from the network of important archives and initiatives – this could be the best way to protect documentations from being lost. 2.) But also the establishment of an appropriate research institution bringing together the best heads of the field would be necessary. 3.) The European Commission expressed the goal to double funds for pilot projects in interdisciplinary fundamental research! But this is not enough: for up to date digital humanities, the funding structures must be internationalized in ways similar to those enabling modern astronomy, genomics and climatology. In order to create enough momentum and the necessary sustainability, responsible sponsors like NSF, DFG, the EU, etc. have to ensure international long-term sustainable structures. Only when we develop systematic and concentrated strategies of collecting, preservation and research we will be able to fulfill the task which digital culture demands in the 21st Century. In astronomy, the funding agencies developed and modernized their systems towards sustainability. The virtual observatory infrastructure is funded on an on-going basis and there is international co-ordination between a dozen or so countries that produce astronomical data.

For Media Art Research, a commitment by the best experts from the field is needed in a long-term occupation. Let's recall the enormous and sustaining infrastructure that was developed for traditional artistic media, painting, sculpture, architecture, even film, photography and their corresponding archives over the course of the last century. What is needed is an appropriate structure to preserve at least the usual one to six per cent of present media art production, the best works. If we compare the world-wide available budget for traditional art forms with the one for digital culture then we understand how inadequate the support for our present digital culture, the most complex material based art, is; it is almost statistically immeasurable. The faster this essential modification to our cultural heritage record can be carried out, the smaller the gap in the cultural memory; shedding light on the dark years, which started about 1960 and lasts till now.

Hearing that there are experts of contemporary (old media art, sculpture, painting etc) that try to exclude the art of our time with the widest need is sad and ironically, as we learned from Shanken, Cubitt and Thomas, the exponents of an exclusion of media art justify this by its connection with technology.

This confession truly is a disaster, not so much for the interests of those people, but for the tax paying public, who deserves the right to be enabled to think about our time through media art. It might be 'blindness,' but it seems more a desire to keep life easy and save the time needed to understand the immense complexity of media art and its preservation needs. This ignorance is not something we should just tolerate: it means that although our societies – the political, financial, and cultural – are more and more driven by modern technologies, the art market, a number of biennales and most 'contemporary art museums' deny the public, which pays their bills, the needed aesthetic and intellectual confrontation with the art of our time. The attempt to separate art from its time is not new, it is also comparable with earlier movements of world escapism, like the forms of 19th century historicism; but our modern societies need to be enabled to reflect on their time and future and, as we know, media art plays a seminal role in that process.

As we see, Media Art needs as many bridges as possible: conferences, new scientific tools like databases and text repositories, new strategies for documentation and visual analysis of complex data, new curricula for the next generation of teachers and collectors. Maybe in a near future we can create collective tools, as represented in Christa Sommerer and Laurent Mignonneau's work *The Living Web*, which generates a spatial information sphere from search engines for web images in a CAVE. The work represents a new instrument for visual analysis, with the option of comparing up to one thousand images in a scientific discussion. Captivating new visualization tools could provide access to the breadth of digital cultural production, which, coupled with the depth of historical optical media, can enable new unpredictable understandings of today's image revolution.

REDISCOVERING HIROSHI KAWANO – JAPAN’S PIONEER OF COMPUTER ART

Simone Gristwood

The paper that follows stems from interviews and conversations held with Hiroshi Kawano in Japan in 2009 and Germany in 2010, as well as from research undertaken with the support of ZKM|Zentrum für Kunst und Medientechnologie, where the Kawano archive has been held since 2010. The author has also used information gathered through personal correspondence with the artist. This paper forms part of the early stages of an ongoing study into Kawano’s life and work.

It is well known that the 1960s was a pioneering decade in the history of computer art, particularly in the West. However, little attention has so far been paid to equally important work being undertaken in Japan. This paper aims to introduce some of the innovative work that was taking place in Japan at this time, and its origins and activities. With the aim of highlighting the importance of this little known history, particular attention will be paid to the work of Hiroshi Kawano (1925 -). Kawano is a philosopher and aesthetician who was interested in both visual art and music, with the first publication of his visual art as early as 1964 in the *IBM Review*, making him one of the earliest pioneers experimenting with computing technologies in art. The paper will discuss how he first became interested in using computers as a way to apply his theory inspired by Max Bense and Claude Shannon, to visual art. His early theories, influences and experiments in the 1960s will be considered as well as his participation in the First Computer Art Contest Exhibition in Tokyo in 1968 and his first solo exhibition that took place in Tokyo in 1970.

Kawano takes a unique position as a philosopher and aesthetician who approached computing technologies with a view to experimenting with aesthetic theory rather than as an artist or engineer. He first studied traditional approaches to aesthetics in the department of philosophy at the University of Tokyo as both an undergraduate (1948-1951) and graduate student (1951-1955). However, despite his love of traditional aesthetics, Kawano moved away from this approach when he was an assistant in the department of aesthetics at the University of Tokyo.

It was here that Kawano came across the work of German philosopher Max Bense and American mathematician Claude Shannon around 1956. Kawano hoped to find a breakthrough – a new approach to study aesthetics - and after reading Bense (*Aesthetica*, 1954) followed by Shannon (*A Mathematical Theory of Communication* 1948), Kawano saw the potential to use these approaches to aesthetics and the possibility of their application to art. Kawano first published an article about his ideas on Information Aesthetics in 1962 entitled 美学的情報理論の一考察 (*Inquiry into Aesthetic Information Theory*) [1] and soon after began writing about the possibility for using computers for art. In 1964 Kawano began to program computer graphics.

In order to be able to apply these theories, Kawano began to study the Markov process model. Markov chains are probability-based mathematical states demonstrated by sequences of random patterns. The properties of these chains are defined either by their relationship between the present state and that which immediately precedes it, rather than its entire output history, or the present state alone. This approach worked well with Shannon’s theory with regards to language and the letter-based approach if

the alphabet is thought of as a kind of chain. Kawano found that Markov theory had been applied to linguistics and musical expression already, yet he wanted to break from the one-dimensional structure in order to apply the Markov model to visual expression.

Despite studying mathematical approaches such as that of Markov, and grappling with alternative approaches to aesthetics relation to information processing, it was not until a few years later that Kawano began to use computers. Around 1960 the University of Tokyo opened a computer centre that all students, staff and members of the University were permitted to access, and where they could study programming. Kawano began to study programming independently in 1963 in this Computer Centre. He learned the assembler language and used the OKITAC computer. (Fortran, which Kawano first used in 1966, was not introduced in Japan until a few years later). The OKITAC was a room-sized computer made by the Oki Electric Company in Japan that used a magnetic core memory and was attached to a line printer – an output device that influenced, and proved useful for Kawano's approach.

Kawano first published some of his designs made using the OKITAC 5090A in an article about *Computing and Design* in the Japan IMB Review in 1964 [2] and another (*Series of Pattern; Flow*) in November of that year in the Science Yomiuri. [3] Nevertheless, *Series of Pattern: Flow* was actually only "a prototype for his masterpiece *Simulated Colour Mosaic* using a more complex quadruple Markov chain for the vertical and horizontal directions, which was published later in 1969. [4]

Kawano not only saw the potential for creating visual art using the Markov method, but also other art forms such as poems for which he looked to traditional Japanese Tanka poems of 31 letters/characters. Kawano remembers that programming would take many hours, however, the most time consuming aspect to producing works in this way was making the concept for the tree-type Markov model structure. He recalls the concept might have taken as long as one or two months, but writing the program was simple, and generating the poems was even simpler.

In 1967 Japan held its first (and only) computer art contest at the Sankei Building in Tokyo (though there were further exhibitions of computer art in Japan). The exhibition that was held in March 1968 included exhibited works by the CTG, Kawano as well as the first computer animation in Japan. A summary of the exhibition was published a month later in COMPUTOPIA magazine. [5]

Three years later, in 1970 Kawano held his first solo exhibition at the Plaza DIC, Tokyo for ten days between 5th and 14th October. The Plaza DIC is the exhibition hall of the Great Japan Ink Company, a printing company situated in the Nihonbashi area of Tokyo. The exhibition space was found with the help of Kawano's friend and well-known graphic designer of the time, Mitsuo Katsui. The preparation for the exhibition took approximately six months. This included time to complete the programming, printing the output and painting the output. The works were completed on a HITAC 5020 digital computer, designed by Hitachi, using FORTRAN 4 code. In an article about the exhibition published in Kawano is attributed to "planning, Programming and text", the HITAC5020 for "design and works." [6]

The exhibition is significant because not only because it showcased Kawano's work - and in particular, *Simulated Colour Mosaic*, as well as other studies and output, but it also showed his early ideas beginning to develop in relation to artificial intelligence and art, a topic he would come to explore more deeply from the mid 1970's onwards.

This paper has briefly outlined the early stages and work of one of the pioneers of early computer art; Hiroshi Kawano. It has given an introductory overview of the early period in his academic life from when he began to explore new theories and move away from traditional aesthetics in the late 1950s. It has also shown how he progressed to using computing technology to apply his aesthetic ideas to art at a time when internationally, only a few pioneers had begun to explore these areas.

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METAPLASTICITY & INNER BODY SCHEMAS: VR FOR CHRONIC PAIN

DIANE GROMALA

This paper describes a new paradigm of VR created for chronic pain that turns ideas of pain distraction inside-out. This paradigm enables manipulation of inner states, emphasizing the role of aesthetics in therapeutic contexts. We propose that this paradigm extends ideas of body image and schema and dissociative states, providing evidence that managing inner states is possible, a process referred to as meta-neuroplasticity.



The three VEs developed to address chronic pain integrate immersive VR with biofeedback, which serves as a primary means of navigation. The VEs are designed to help immersants become aware of and to gain agency with their inner states in an effort to remap their pain and body schema. Copyright Diane Gromala, 2010.

Pain[s]

Pain is a boundary condition – a non-normative experience that can alter one’s perception, distorting it beyond all imaginings. By understanding boundary conditions in more depth, the Transforming Pain Research Group (TPRG) believes that more normative states may be more fully understood.

All humans experience pain[1], an essential warning system that alerts us to injury or disease. Like the historical figure of the pharmakon, pain is indeterminate, unquantifiable and beyond language. When intense, pain is beyond sharing, causing one to curl into oneself in a primal way, stripping away, bit by bit, our most basic feature as a social creature: our ability to communicate or connect with other humans. In *The Body in Pain: The Making and Unmaking of the World*, Elaine Scarry explains that pain “. . . unlike any other state of consciousness – has no referential content. It is not of or for anything. It is precisely because it takes no object that it, more than any other phenomenon, resists objectification in language” [2]. Pain bears other paradoxes: certain kinds, such as childbirth pain, work in tandem with other biochemical actions, and are thus dimly remembered; other forms, like chronic pain, prevent the kind of forgetting that habituation usually enables [3].

Chronic pain is a category of pain that significantly differs from acute or short-term pain. Acute pain is a symptom of a disease or injury; once the originating disease or injury is cured, acute pain subsides. In contrast, chronic pain is defined as a disease, an on-going, degenerative state [4] in which the pain response systems remain ‘stuck’ in high gear. Although chronic pain affects, by conservative estimates, one in five people in so-called industrialized countries [5], little is known about its causes or mechanisms. Because chronic pain cannot be cured, the emphasis is on managing this usually lifelong kind of pain.

Background

1991 marked the seventh year I had unremitting, chronic pain. What seemed like a hundred odysseys in search of even temporary ease led, in that year, to two parallel experiences – universes apart, they nevertheless were what neuroscientists term dissociative states. Far from out-of-body travel, they were scramblings of inner and outer sensations, a fluid, otherworldly state that I glimpsed in meditative practices. These practices enabled me to ‘remap’ my pain, a hard-won ability, to put it in the background of figure/ground experiences that comprise my moment-to-moment, everyday states.

The first of these two experiences was at the Blue Mosque, during a sunny afternoon in Istanbul. The second was in a computer lab in the Banff Centre for the Arts in Canada. In a kind of fate that is too unbelievable to concoct, I was able, to combine and recreate these experiences in an artwork I produced with Yacov Sharir in *Dancing with the Virtual Dervish: Virtual Bodies* [6]. One of the very first VR artworks, this collaborative effort was continually refined over a decade. The virtual world that immersants experienced was a torso, derived from an MRI of my torso that physicians insisted on in some quixotic quest to ‘verify’ that some non-existent biomarker of a disease or injury was the cause of my pain [7]. By recontextualizing this torso as a virtual environment (VE) to inhabit, Sharir and I strove to create virtual worlds to inhabit in unfamiliar ways. The VE comprised continuously decaying and reforming skeletal bones that defined a non-rectilinear space, while smaller organs revealed unexpectedly immense and abstract worlds.

Although we created this work at the height of technological discourses favoring a disembodied view, ours countered it. In our view, the new sensations of ‘flying’ while simultaneously feeling the tug of gravity, or of becoming aware of proprioception, were experiential states that one could not easily brush away into the bin of disembodied experience. This appears to have escaped art critics at that time, perhaps because the notion of transcendent or dissociative states seem to be predicated on an assumption that one is leaving one’s body, not experiencing it in new ways.

Throughout the next two decades, I explored multiple ways in which diverse technologies could provoke non-normative states that brought usually quiescent, inner sensations to the foreground of awareness, from interactive books made of meat [8] and typographic fonts that changed according to one's biofeedback to evolving forms of VR [9]. Although the TPRG investigates other technologies from robotics to social media, VR is currently our main focus, in part because prior and current research makes it clear that VR provokes or opens access to inner sensations in multiple and persistent ways.

Immersive VR

Building on our experience in creating well-known virtual environments designed for artistic [6], cultural heritage [10] and medical applications [9], we examine the affordances of immersive VR through a fundamental human experience – pain. Known strategies for managing chronic pain necessitate that we design systems which bring inner senses to the foreground of awareness, and sometimes are seemingly exteriorized so chronic pain patients may learn how to remap their pain in sustainable ways.

Although virtual reality is admittedly an unfortunate term, artists and others working in videogames and online communities such as Second Life redefine the terms 'virtual' and 'immersive,' eliding the longstanding distinction between screen-based work and immersive VR as defined by its originating disciplines, or they perhaps mix ideas of social presence with immersion [11].

VR differs from 3D videogames and online communities, however, in the complexity and affordances of its integrated technologies, including interactive stereoscopy, spatialized sound, haptic force-feedback and six degrees of freedom, among others. But the most important distinctions are experiential: in VR, attention is far more directed, and the human sensorium – interceptive and exteroceptive – is tightly bound in technological entanglements, or what computer scientists term feedback loops. And although much of the focus is on experiences manifested within the VE, these experiences persist beyond it. The use of immersive VR for training pilots and surgeons illustrates the profound degrees to which our embodied processes are affected in long-term ways that alter perceptual, neurological, sensorial, autonomic and other systems. The brain and nervous system were believed to have been set in adulthood; however, their long-term malleability that results in structural changes is now recognized as meta-neuroplasticity.

Although similar phenomena may be observed in other media forms, immersive VR maintains specific affordances that are important to explore. The intensity of sensorial and embodied perceptual involvement in VR remains profoundly and measurably different. For these reasons, I maintain the longstanding distinction between immersive VR and other interactive, 3D work.

Pain and VR

The tendencies to create enhanced, unfamiliar and dissociative experiences, and to explore boundary conditions, have deep roots in human history: we have carved out spaces, places and environments; created communal experiences and practices; and ingested opioids, hallucinogens and now-common mood-altering drugs [12]. It is, therefore, perhaps no surprise that humans have developed technologies that function similarly.

Over the past decade, immersive VR has been explored as a non-pharmacological analgesic [13], a sensorially-rich method of 'pain distraction' for attenuating acute pain. This directing of attention outward

proved to be more effective than videogames in reducing pain, and provocatively, is on par with opioids. Simultaneously, V.S. Ramachandran's research in how chronic pain may relate to body image and body schema grew from his use of mirrors to produce analgesic effects for phantom pain[14]. The profound effectiveness of mirrors in alleviating phantom pain led to the acceptance of mirrors as the first instance of 'VR' for pain [15].

Still other forms of technology initiated by Paul Bach-y-Rita enable sensory substitution [16]; this further demonstrated that our neurological systems are plastic or not as hard-wired as was once believed.

Current Work

Currently, our three works-in-progress are varied VEs created to address chronic pain. The first, nearing completion, is the Virtual Meditative Walk, an extension of our prior work, the Meditation Chamber [9]. It integrates VR with biofeedback and a treadmill to train immersants in mindfulness meditation. Both biofeedback and mindfulness meditation have proved to be effective in treating chronic pain [17] through 'self-modulation.' In studying the different forms of meditation across cultures, we chose walking meditation [18] because many who have chronic pain become less active, a phenomenon referred to as kinesiophobia. In the Virtual Meditative Walk, immersants slowly walk on a treadmill while their GSR (galvanic skin response) and HRV (heart rate variability) data are fed into a computer. This data drives the visual, binaural and spatialized sonic elements in real-time. Immersants see a 3D forest that changes form in response to moment-to-moment changes in their physiological data. Immersants also initially hear a vocal 'coach' that guides them through the method of walking meditation.

We are concurrently developing two other prototypes that use similar biofeedback as a method of interaction. Cool! is a snowy world, created in partnership with Firsthand. Seated immersants develop skill in meditating – the more they approach a meditative state, the higher they 'hover,' to about a meter above the terrain. The VE becomes progressively non-realistic, designed to enhance a sense of weightless 'floating' that is often noted by experienced meditators.

Both prototypes comprise several phases. The first phase is designed so that immersants may discover the cause-and-effect relationships between biofeedback and those aspects of the VE that respond. An important issue that remains unexplored by others is that when those who have chronic pain try to meditate for the first time, their awareness of their pain tends to temporarily spike. To address this, we designed non-normative experiences, such as hovering or manipulating proprioception. Proprioception, the sense of where we are in our bodies and where its boundaries may be, affects one's body schema. We think that the unfamiliar experience of distorting proprioception may help immersants manage their initial spike in pain, and may help them discover that they can learn to self-modulate their pain by remapping their body schema. Initial tests appear to confirm that this approach indeed works [9]. The aesthetics of the VE are crucial here, for artists are arguably expert in creating otherworldly or non-normative experiences that are compelling enough to evoke one's sense of proprioception.

Through this work, we have found that visuals tend to pull one's attention outward, while non-linguistic sound seems to remain in an ambient or background relation to attention. Thus, the second phase promotes a transition of focus from the visual to the sonic. It is in this phase that immersants accrue their greatest skills in meditation practices.

The Sonic Cradle, our third and fully developed VE, is predominantly sonic, and does not incorporate any visuals. Immersants sit in a suspended, semi-reclined hammock. They are told little except that they should breathe slowly and regularly from the belly, which alters sounds in real time. When they hear a sound they like, they hold a deep breath in order to 'add' that sound to the on-going sonic composition. Immersants don't know that this VE is built upon Kundalini Yoga practice and theory. The sounds spatially rotate counter-clockwise among four speakers, while a sub-woofer vibrates the pelvis. According to principles of Kundalini Yoga, rotating sound in this way enhances our body's electric field. This system is designed for immersants to add sounds and repetition in order to drive this field up and out toward the ceiling. While little scientific evidence has verified this phenomenon, initial participants report that they feel deeply relaxed and 'float' upwards, which they describe as mildly euphoric. These reactions are probably not responses to any known intention of the system design, since no references to mediation or yoga are made.

Neuroplasticity: Persistent & Intentional Change

In the wider, related arenas of VR research, the process and role of gaining skills to intentionally manipulate inner or interoceptive senses – besides exposure therapy – has rarely been explored. Although 100,000 times more of our resources are dedicated to sensing inner states, compared to those for the five exteroceptive senses [19], our inner states are necessarily quiescent, lest they overwhelm our awareness [20]. Yet humans have the ability to learn how to access and consciously affect some of these inner states, as evinced by yogic traditions, biofeedback and newer technologies with intensive practice, these skills result in longterm changes.

Unlike pain distraction, which is useful for acute pain, the TPRG developed a different paradigm designed to enable those with chronic pain to learn both biofeedback and mindfulness meditation. Both are skills that persist beyond VR, and are standard in managing chronic pain. Obviously, technology is unnecessary for learning how to meditate. However, it provides real-time feedback, which our subjects report is important for learning, and reduces frustration in not knowing if they are making progress [9]. The tight feedback loops and multiple perceptual and sensory modes engaged by VR appear to enhance skill acquisition, according to over 400 immersants [ibid]. Finally, skills acquired in a VE are known to persist. With practice, we believe it is possible for immersants to make long-term meta-neuroplastic changes that may dampen pain levels. Therefore, we are using standard pain research methods to measure pain thresholds.

Our design of these VR systems takes the knowledge of media producers, interactive artists and sound designers as fundamental. Through extensive preparatory interviews and participation by patients, we have learned that in the first phase the VEs must act in direct response to immersant's changing inner states. In other phases, however, the VE functions better as a counterpoint. The visuals and sounds are emphasized and de-emphasized, according to the ways immersants respond.

We have also learned that expectations based on knowledge of other media do not directly translate in immersive environments. For example, when walking and meditating, a meditator learns not to become

distracted by visuals. They concentrate on what it feels like to step forward, using their peripheral vision as an ambient guide. Thus, while we believed that fog would parallel this experience, we found the inverse to be true. Therefore, we are developing principles derived from interactive art, media studies, perceptual science and neuroscience. None provide working principles in isolation, yet their combination appears to work. At present, we are focusing on ideas from the nascent area of neuroaesthetics, particularly by creating a VE to work with and against body image and schema, and by drawing upon aesthetics from Indian and Middle Eastern samas. It is important to note that the ways in which chronic pain affects experience foregrounds our work. For example, those who have chronic pain are often sensitive to certain kinds of sound, and have issues with moving and anxiety, among other factors.

Finally, while recent technological advances have dramatically reduced the cost of VR, it remains relatively complex and inaccessible. Thus, we are testing our systems in physicians' clinics and hospitals so that chronic pain patients will not need to travel to another site. Further, these systems are being extended to home computers and mobile devices, both to reinforce the VR meditation sessions, and to track progress, compliance and changing pain levels.

User testing includes both qualitative and quantitative methods, drawing upon the varied expertise of each researcher. It is particularly fortunate that the preponderance of wider research in chronic pain is based on a biopsychosocial model. While the group members work together to create the VR systems and methods of testing, each member also examines ideas within their particular domain. This approach prevents any one disciplinary bias from dominating, yet allows for concurrent research in each discipline.

Conclusion

Because VR has been successfully used in therapeutic realms, including treating acute pain, numerous researchers have called for the development of VR to address chronic pain [15]. The TPRG is the only group we are aware of that focuses specifically on VR for chronic pain. The VEs we create are designed to help immersants with chronic pain to learn biofeedback and mindfulness meditation techniques. These are long-term, intensive skills which, when practiced, are effective ways of self-managing chronic pain. We verified that the affordances of VR provide real-time feedback that enhances skill acquisition, and are investigating how the roles of dissociative experiences may help initial spikes in pain, and in learning to remap relations between pain and body schemas. Our paradigm runs counter to methods of pain distraction, since it is unreasonable to spend all wakeful hours in VR. By focusing on learning skills to self-modulate inner states, we believe this paradigm may extend knowledge of VR as it relates to body image, body schema, dissociative states, chronic pain and pain self-management. The focus on the aesthetics of VR distinguishes this work from other therapeutic uses of VR. Finally, if our paradigm proves successful, we believe that what is learned in VR and practiced outside of it may persist in ways that reduce pain levels and may result in structural, meta-neuroplastic changes.

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BOTANOADOPT, A PARTICIPATORY INTERDISCIPLINARY ART PROJECT

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botanoadopt is a participatory interdisciplinary art project among art, science and social commitment. The project defines plants as independent beings and offers them for adoption on the internet. A hatch is available for the anonymous local handover of plants. The humorous contextual displacement makes it possible to question one's own definition of nature, and the adoption process establishes links with the theme of responsibility.

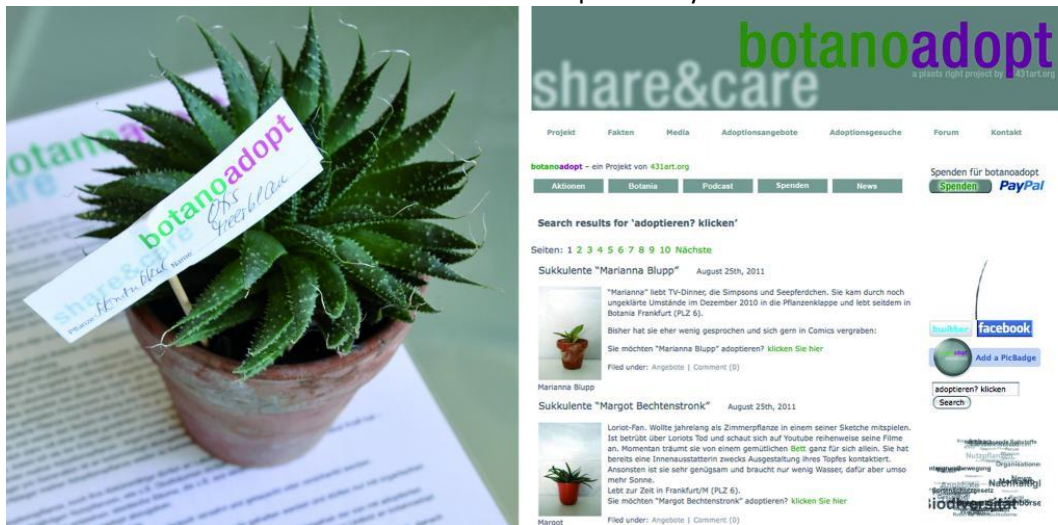


Fig. 1. botanoadopt plant, adoption contract | Internetplatform www.botanoadopt.org, 2011, 2009 © by 431art, living plants, website, photo: © by 431art



Fig. 2. plants hatch, 2009, © by 431art (Used with permission.), wood, aluminium, LED, 60 cm x 80 cm x 60 cm, Photo: © by 431art

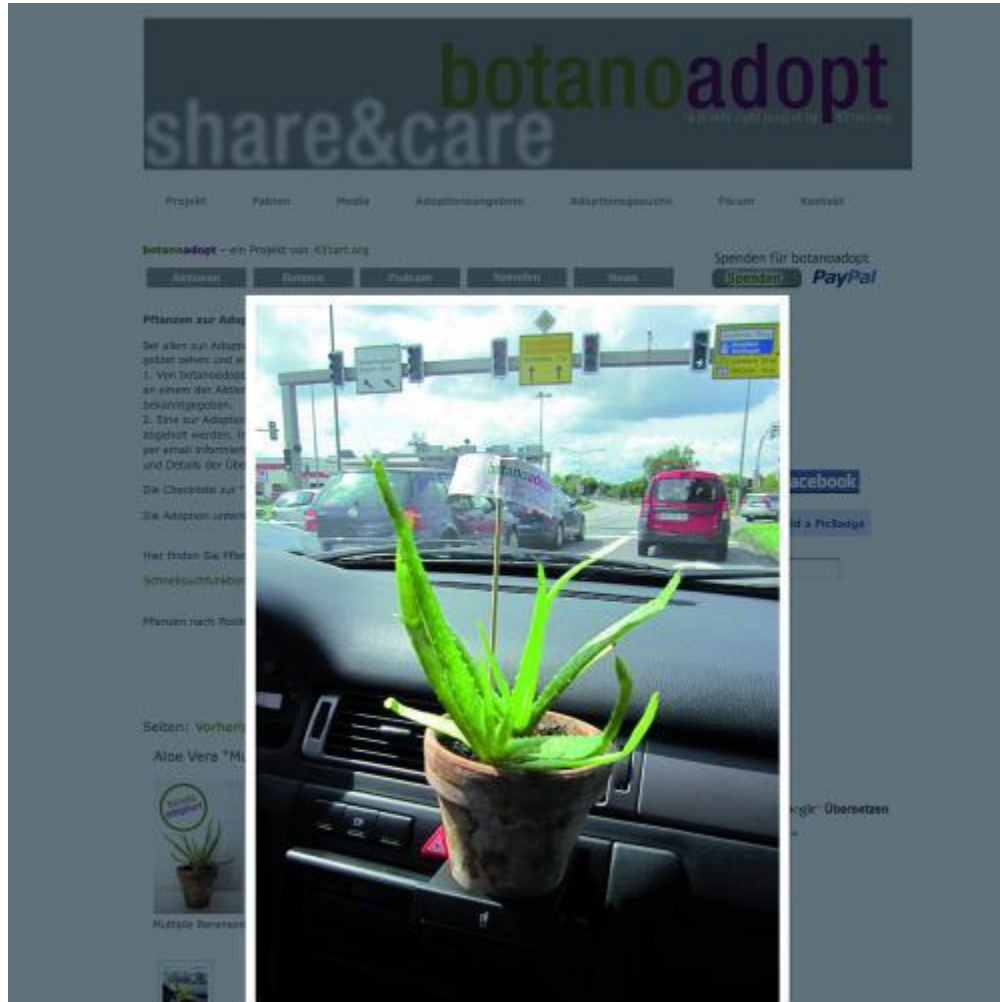


Fig. 3. Internetplattform www.botanoadopt.org with feedback-photo of adopted plant, 2009, 2011 © by 431art, Feedback-photo: Pedit Matthies, © by 431art

Introduction

Botanoadopt is a participatory interdisciplinary art-project among art, science and social commitment. The project shifts perspectives by humorous recontextualizations.

Botanoadopt presents plants with charming biographies as independent individuals and offers them for adoption on the internet. A plants hatch is available for the anonymous local handover of plants. The adoption contract asks adopters to send botanoadopt photos of their fosterlings. These photos are then published at botanoadopt.org offering insights into the socio-cultural environments of the whereabouts of the plants.

The humorous recontextualizations allow to question one's own definition of nature, and the adoption process insinuates the topic of responsibility. Botanoadopt draws on alternative economic models of exchange and donation.

Thus the issue of environmentally responsible behaviour is investigated via models derived from realms beyond the boundaries of art.

Keyrole of plants, artistic statement and strategy

"Never before has the extinction of species been as massive as today. If this development will continue, it is to be feared that within a shortest period of time flora and fauna will shrink by 60-90%." [1] At the same time plants from all over the world are merchandised as mere decoration items. Several stores offer them very cheap and as a consequence plants are seen and treated as disposables.

Here, at this massive discrepancy botanoadopt comes into play. In merchandise management systems plants are regarded and used as decoration, as food and as supplier of material resources. Woodlands formerly considered as inviolable and to be protected are more and more subject to economic interests. Botanoadopt subverts this political and economical system by defining plants as individual beings and by taking them out of the circulation of commodities. As a result, the only possibility to obtain a botanoadopt plant is by way of adoption.

Botanoadopt is a participatory art-project with the aim of rethinking our idea of nature as such. Plants are playing a keyrole on our planet. They could live without human beings easily. Conversely, men are not able to survive on planet earth without plants. The artistic statement of botanoadopt is: plants are individuals with their own independent perception.

Plants interact with their surrounding in a very sensitive way. For example, they react extremely sensitively to negative thoughts. The book "The Secret Life of Plants" [2] explores the concept that plants may have sensations, despite their lack of a nervous system and a brain. To prove this the authors, Peter Tompkins and Christopher Bird, describe several scientific experiments and evoke a deeper understanding of plant life.

This undergirds our artistic theses: Every plant is to be seen as an individual being with its own perception, its own name and its individual biography. This biography deals with social, emotional, economic or ecological aspects. With the adoption project we are blurring the line between fact and fiction, in order to broaden the perspective, to leave behind common definitions of nature, to open avenues of thought leading to new and individual concepts of nature.

After having rescued several plants from the trash heap in the year 2006, we clearly became aware, that a basic knowledge about plants is not part of our general education anymore. Withered plants are thrown away even if they were able to live on for years to come. Usually, they just need a short recovery time – a normal and necessary process within the cycle of nature. The daily life of industrial societies is no longer connected with these cycles. We think that this loss of being involved into the cycles of nature and the imperative of our capitalist society to be productive all the time and everywhere while ignoring the current critical environmental situation, is the main cause of the immense social and environmental problems of our planet.

Saving plants and giving them up for adoption with name and biography is our strategy, that people become aware of their own definition of nature and behavior. Even a small house plant which could be bought very cheap and easily is a living being.

baseline shifts and modules of botanoadopt

BOTANIA

In 2006 we founded the plants village "Botania". Its name refers to the free city-state "Christiania," [3] which is part of Copenhagen, the capital of Denmark. "Christiania" was founded in 1971. It is a self-regulated state without police forces. Its peoples' aim is to live in peace with each other and in harmony with nature. This idea is strongly influenced by the hippie movement. Accordingly, in "Botania" plants can recover from their sufferings and bad treatments. "Botania" can as well be seen as a symbol for the utopia of living together in peace.

INTERNETPLATFORM BOTANOADOPT.ORG

Nowadays life is deeply influenced by digital technology. So our aim was to realise our main idea with the aid of Internet technology, not only as a means to advertise the project all over the world, but also as a means to help nature. The Internet platform botanoadopt.org was launched at the beginning of 2009 and is a digital interactive network to organize a different and sustainable future society.

The website offers plants for adoption (Fig. 1). Plants handed in from all over Germany are given a name, a biography and an ID picture. The biographies inform about family background, preferences and the respective relationship patterns of the plant individuals. These biographical profiles play a key role in our project and exemplarily exhibit our artistic approach: the humorous shifting of contexts.

Succulent "Edward Tomlinson," [4] a plant of Argentinean origin, grew up in London and has been training Polo since he was a little child. He founded one of the first botanic Polo teams in Great Britain. This team did its secret nightly training in the Royal Botanic Gardens until unfortunately several windowpanes got broken by a club. The incident was never cleared up. Nevertheless the players moved their activities to Richmond Park, became the world's best botanic Polo team and arranged tournaments in the Hyde Park once a year. With a handicap of +7, "Edward" is among the best players of his age and committed himself to achieve the official recognition of plants as professional Polo players. Furthermore, he is interested in Sinology and has a liking for red-white checked ties. Edward found a new home in Huddasfield, UK.

Money tree "Lehman" [5] is a latecomer and the youngest of four brothers. He left his extremely materialistically orientated family very early and tried to become a stand-up comedian. Due to certain language barriers and his appearance the audience regarded him as stopgap. But he kept his life's motto: "Humour is laughing in spite of it all!". Against his wish he was brought into a casino and explored the rules of successful gambling. He internalized them and now he helps everyone close to him to gain material wealth that is based on natural growth. Eventually, a leading employee of a German financial institution at Frankfurt/Main adopted "Lehman".

At the end of 2009 an article about botanoadopt and "Lehman" whose name and biography refers to the Lehman Brothers and the crash of the financial market was published by in the German version of the "Financial Times". This article is an example, how deep botanoadopt is interwoven with contemporary society beyond the strong boundaries of art.

Botanoadopt is an entirely non-commercial project. The "currency" adoptive parents have to pay is responsibility. The adoption is regulated by a contract and the adopting person undertakes to send a photo of his protégé to botanoadopt twice a year. These photos are published on the web, so that every visitor can follow the development not only of the adopted plants, but also of the sociocultural environment that is partially documented in the photographs.

WEBSITE AS ADOPTION PLATFORM AND POOL OF KNOWLEDGE

One can easily apply for adoption by an online form. Available plants can be found by full text research and postal code. A checklist [6] for plant adoption offers an aptitude test to every potential adoptive parent. More than 350 plants have already been adopted; most of them live in Germany and some others all over Europe.

In general, the adoptive parents pick up the plant themselves – residence and first digit of the postal code are published on botanoadopt.org, so that plants in your area can be easily found and selected (Fig. 3). Adoptiv parents collect their fosterling at the plant owners home. In this way people independently from their origin, education, religion or social status meet each other. In rare cases plants will be sent by mail or by organizing a lift. On botanoadopt.org it is also possible to put plants up for adoption, a service that has been used by people from all over Germany.

The website offers a huge and versatile pool of knowledge and tagged articles, as well as online-databases on plants and biodiversity. This collection is constantly updated and can be consulted under "Fakten." Thus, botanoadopt.org can also be used as a knowledge base. In addition to biological facts about plants, many more facts about genetic engineering, farming, scientific research, new European laws or biodiversity can be found. Eventually, links to other non-commercial organisations, networks and projects are provided, that altogether aim at a new view of nature. The virtual platform contains a wide range of topics around our central theme plants life.

The page "Media" is linked to documentaries and reports like for instance a documentary film about Monsanto [7] or a report about "Smart Plants" (both ARTE). A "Forum" can be used for knowledge exchange. The whole project combines online- and offline strategies. It brings together global concerns with local actions as well as digital technologies with plants life. Conversely, locally based actions are always announced and documented on the Internet platform and published by using social networks as facebook and twitter. As we implemented the translation tool of Google on our website, botanoadopt can be visited from all over the world.

PLANTS-HATCH

Independently from the Internet, we also wanted to create a space where everyone can hand in his unwanted plant anonymously and without restrictions, instead of throwing it away. Consequently we invented the "Pflanzenklappe" (plants hatch) in which unwanted plants can be put into similar to the

human baby hatch (Fig. 2). The "Pflanzenklappe" takes place at different locations for only a short period of time of 10 up to 14 days. Its idea is derived from the baby hatch, which is very popular in Germany and Japan too. Baby hatches can be linked to the former parochial custom to care about anonymous babies abandoned from mothers in trouble. Those babies were usually left in wicker baskets at church entrances.

The idea of altruism, which is anchored in every religious system, leads to the ethical code of caring about others, particularly about persons with physical infirmities, disabilities or maladies; this code also includes the requirement to pay respect to old persons. Accordingly, adopting a plant or using the plants hatch is an act that shows respect for plants and their invaluable capability to clean our air, to nourish us, to provide resources and medicine, which helps us to relax, to smell good and to have fun.

In February 2009 the worldwide first plants hatch was officially unveiled in Schöppingen by its mayor. The word "Pflanzenklappe" led to more than 100.000 Google-entries within 10 days. Journalists from all over the world were reporting about the plants hatch. The plants hatch 2009 and 2010 was mounted in different districts of Frankfurt/Main and in September 2010 in the botanical garden of Münster. During a period of 10 days, more than 150 plants were left in the plants hatch.

ON-SITE ACTIVITIES

Furthermore, botanadopt arranges regular on-site activities and performances in different cities, e.g. adoption offices and empathy trainings. Adoption offices were installed so far in Frankfurt, Berlin, Cologne, Schöppingen, Münster, Dortmund and London. In 2011 an adoption office offered its services at the Schirn Kunsthalle Frankfurt. The empathy trainings offer "trainees" the opportunity to test their capacity to be empathetic and – at best – to develop and increase it.

BANNWALD - A FOREST MIGRATION

Another botanadopt activity was the "Bannwald-Migration" at Kelsterbach close to Rhein-Main-Airport in February 2009. With the help of proactive supporters botanadopt saved 34 beech tree seedlings from a "Bannwald", that faced clearing because of preparing works for a new airstrip.

In Germany a "Bannwald" [8] is a forest that is protected by law and has to be maintained in any case. The "Bannwald" near Frankfurt was protected by law since the early 1980s as a result of the protests against the runway "Startbahn West," [9] which was being built in a former forest. In 2009, 25 years later, this "Bannwald" had to disappear in order to clear space for another runway.

2009 the company was really well prepared, the whole building area was surrounded by fences and protected by the police. Therefore, botanadopt decided to intervene tactically and create a catch-22: We successfully managed to pass the police barriers unchecked, gained access to the area and collected a big bag of young beech trees, while nature activists were living in tree houses to save the forest.

Finally, botanadopt succeeded to shift 31 of them to the grounds of a foundation in Schöppingen, where a new forest was created – a site-specific artwork called "Bannwald". The mayor of Schöppingen adopted another three beech tree seedlings.

CONCLUSIONS AND FUTURE

botanoadopt saved more than 350 plants since 2009. Most of them were given away anonymously by using the plants-hatch. These plants live in their new homes in Germany and other European countries. In general plants could be adopted by using our Internetplatform or in locally based adoption-offices, f.e. 2011 in front of Schirn Kunsthalle Frankfurt. In 2012 we plan to install the plants-hatch accompanied by adoption-offices f.e. in Cologne. Furthermore we are developing an interdisciplinary participatory education concept, which will start 2012.

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COLONIZATION AND SCIENCE NETWORKS BETWEEN PERIPHERIES AND THE CENTER: THE CASE OF THE NATURALIST FRITZ MÜLLER

YARA GUASQUE

The correspondence and the exchange of specimens between Fritz Müller, 1822-1897, and Charles Darwin, 1809-1882, characterize what Bruno Latour called transformation networks. The naturalist's procedure in his observation of the phenomena in loco in the forest could only be legitimized as science after the screening of the "transformation networks".

The construction of scientific knowledge takes place far away from the periphery where data are collected. The scientist, with a focused view that differs from that of the naturalist immersed in the forest, reduces the phenomenon to an abstract inscription. The peripheries with their ecosystems are the ones that feed the centers, with data collected among a diversity of phenomena, through the "transformation networks". The correspondence and the exchange of specimens between Fritz Müller, 1822-1897, and Charles Darwin, 1809-1882, characterize what Bruno Latour called transformation networks. Fritz Müller, a voluntary emigrant in the Brazilian South region, belonged to the first settlement group of Dr. Blumenau's colony in Vale do Itajaí – Alto do Itajahy. He found in Brazil an almost untouched nature which he visited in his lonely pilgrimages along the coast and also in the plateau, accompanied by the highway engineer Dr. Oderbrecht, in the service of Dr. Blumenau. Without having visited the capital city of Rio de Janeiro and without ever returning to Europe, Fritz Müller lived 45 years between the village of Blumenau and Desterro, in Santa Catarina – from 1852 to 1897, when he died – and there he conducted studies and research on aquatic flora and fauna - according to Zillig, 'on commission,' [1] sent by letter to his foreign correspondents. The botanical material expatriated through letters has not been dimensioned. *Oxalis*, *Cassia*, *Abutilon*, *Gesneria* — *Corytholoma*, *Maxillaria*, *Plumbago*, *Coccocypselum*, *Eschscholtzia*, *Heteranthera reniformis*, *Epidendrum* are the names contained in the letters he exchanged with Darwin. Many specimens collected by Fritz Müller in the Atlantic Forest biome, which portray the diversity in the South of Brazil in the 19th century, are in the English herbarium of Kew Gardens. In Brazilian institutions, only 158 samples have been preserved, 152 at the National Museum and 6 at the Botanical Garden. Without quantifying the ones sent to Charles Darwin in the form of seeds or dried specimens, Teixeira, Santos, Hagen and Fontes [2] cite the 483 specimens that Fritz Müller sent between 1867 and 1869 to Joseph Dalton Hooker, who was, at the time, the director of Kew Gardens, near London.

Fritz Müller graduated in Medicine in Germany and, attracted by a libertarian dream that had spread in Europe about life in the recently founded German colony, he abandons his country to run away from social and religious pressures. During the period between 1852 and 1897, in which he lived in Santa Catarina, he established a link with Charles Darwin and with other foreign researchers: Hermann Müller and Wilhelm Müller, his brothers, Hans Spemann, Max Johann Sigismund Schültze, Ernst Haeckel, Ernst Krause, Oscar Schmidt, Carl Friedrich Wilhelm Claus, Wilhelm Moritz Keferstein, Friedrich Hildebrand, Friedrich Ludwig and Friedrich Leopold August Weismann in Germany; in France, Henri Milne-Edwards; in Italy, Paul Meyer; in the United Kingdom, Raphael Meldola and Joseph Dalton Hooker; in the United States, Alexander Agassiz, Robert McLachlan and Herman August Hagen. But he continued exchanging information with researchers in Brazil: Ernst Ule, Hermann von Ihering and Nicolau Joaquim Moreira.

Peer recognition contributed to Fritz Müller's projection as a scientist. In the period in which he lived in Brazil, Fritz Müller received several titles, among which two Ph.Ds, sixteen years after the University of Berlin, where he had studied Medicine, denied him this title because he had not taken the oath: Ph.D. *honoris causa* in Medicine, conferred in 1868 by the dean of the School of Medicine of Bonn, Max Schultze, during the festivities in celebration of the 50 years of the School; Ph.D. *honoris causa* in Natural Sciences by the University of Tübingen, in its 400th anniversary celebration in 1874 – the year in which he was also invited to be Correspondent Member of the then recently founded Argentinean zoological society, National Sciences Society, of Buenos Ayres; and the title of Honorary Member of the Entomological Society of London, in 1884.

Although Fritz Müller's garden is large, the space reserved in the house for scientific work is little and modest. A critic has said that the size and opulence of the laboratories were many times in inverse proportion to the importance of the works that were conducted in them. I remembered these words whenever I saw the small office of Blumenau, from where so many fertile ideas were launched to the world. The small room has only three square meters. Beside the window there is a simple table covered with the most necessary devices for work, among which there is an old Hartnack microscope. In addition, there are a very simple bookcase, a bed and a lavatory, and next to the only worn out chair there is room only for a second one. There are no collections. I don't believe that in the entire Earth there is a wise man who is more worthy of this name that is satisfied with such a modest device. But all the zoologists and botanists know how many scientific results were achieved with that small device. [3]

In his voluntary exile in the Southern Hemisphere – which made him venture as a settler in the recently founded colony of Dr. Blumenau – he starts a pioneer research. The Brazilian ports, open at that time to European scientific expeditions, would not reserve to Fritz Müller, a European among us, the post of sole observer of the flora. The fact of having lived in the colony restricted the interchange of ideas with scientists from more advanced cities of the Brazilian Empire, like Rio de Janeiro and São Paulo, but he conducted an investigation in the open air about the coastal vegetable cover and the crustacean larvae of Santa Catarina. His notes survived the timid environment of Desterro, as Florianópolis was then called, and Blumenau, and were also launched beyond the national network of researchers that was being formed around the National Museum of Rio de Janeiro or São Paulo's Museum. His friendship with European scientists, Ernst Krause, Charles Darwin and Ernst Haeckel, among others, enabled him to publish short papers in *Kosmos*, in *Notícias Entomológicas*, and in other zoology journals, such as *Relações da Sociedade Botânica Alemã*. During his exile in Brazil he produced 237 of the 248 papers he wrote in his life. Many of them, extracted from the manuscripts contextualized with detailed illustrations he had shared with his European correspondents, were published abroad as if they had been written by the addressees of his letters. The publications of the National Museum in the Brazilian territory that had been promised by its director, Ladislau de Souza Mello e Netto, if carried out in time, would not be important to the European scientific circle – despite the effort of institutional consolidation.

Although he worked in Brazil with modest equipment, his enormous advantage was the scientific background he obtained through the education and formal schooling he received in his native country, Germany. Afterwards, in Brazil, his education was consolidated by the network of international collaborators and the activities of teacher and Traveling Naturalist. Immersion in the forest did not prevent him from extracting singular discoveries from the live material he observed. We highlight just a few of them, like the insect-plant interaction in the bromelias and orchids; his ontogenetic recapitulation of phylogeny – recognized as an Ernst Haeckel's proposition; his representation, in branch diagrams, of shared characters to show phylogenetic relationships between species – known today as cladistics; and Müller-

ian Mimicry, about which he wrote in 1875. Developing the Batesian Mimesis, in which palatable butterflies imitate unpalatable butterflies, Fritz Müller demonstrated mathematically that, between two species of unpalatable butterflies that imitate each other, the rarest would have a smaller number of losses, being benefited regarding the non-predation of its individuals in an inverse proportion to the square of the number of its individuals. [4]

His investigation for the National Museum, and his job as an elementary school teacher in the cities of Florianópolis and Blumenau, mix with his difficulties to adapt to the Southern hemisphere and live as a colonist in Blumenau. Beside the hard work in the colony and the distance from Rio de Janeiro, another obstacle that the naturalist had to overcome to act professionally as a teacher, and afterwards as a Traveling Naturalist, writing reports, was the Portuguese language.

The legitimation and the scientific nature of his job depended on the international collaboration network, but also, on the enculturation and formation of the Brazilian research institutions, responsible for the scientific circles that were created around them: the National Museum, the Botanical Garden of Rio de Janeiro and São Paulo's Museum, directed by his colleague Ihering from Rio Grande do Sul, also a researcher in the service of the National Museum, like Fritz Müller. The efforts of Imperial Brazil in relation to equipping the scientific and cultural institutions are determinant, although they were still below the expectation of a European with university education. D. Pedro II was recognized in Europe as a friend of the arts and sciences. It is worthy of note the influence of D. Pedro II on the nomination of Fritz Müller for the post of Traveling Naturalist on October 2, 1876, and on his readmission in 1888 – after having been exonerated due to intrigue in 1884. This influence was highlighted in the necrological text written by Ernst Haeckel, when Fritz Müller died. After the proclamation of the Republic in 1889, the National Museum received information from the Minister of Instruction, Post Offices and Telegraphs of the new Government, determining that the Traveling Naturalists had obligatorily to live in the Federal Capital City, Rio de Janeiro. As he did not want to abandon his family and his home in Santa Catarina, Fritz Müller quits the job definitively in 1891. His residence in Blumenau, where he stayed after being dismissed from the job of teacher of the Lycée in Desterro, was his live laboratory, “where he collected a considerable volume of scientific data that have already been incorporated into the collection of zoologists and botanists all over the world”. [5]

The Europeans believed that Fritz Müller's dismissal in 1884 from the post of Traveling Naturalist had a political connotation. A sympathizer with the monarchy regime and with the influence of the imperial family on the political directions of the country, Fritz Müller - a follower of *Deushtum* among many others in the colony – had become inconvenient concerning the purposes of the new State, and of the creation of the nation in the passage from Imperial Brazil, which had brought the division between republicans and federalists.

To take on the post of teacher in a public institution at Desterro, he became naturalized as a Brazilian. As a teacher of the Provincial Lycée of Santa Catarina, he taught Mathematics between 1857 and 1864 and thought about teaching chemistry and physics, among other disciplines, to the more advanced students. This activity kept him “in uninterrupted contact with all branches of the natural sciences and literature, and this contact was much closer than the one he would be able to keep in the subsequent years of his life.” [5] In parallel with teaching, he researched, in his free time in the shore of Desterro, which is now Florianópolis, the medusas, the Bryozoa, the polyps, and the crustaceans, which resulted in the only book he published, *Für Darwin*. The book, concluded in 1863, was published in 1864 by Engelmann in Leipzig, Germany, just five years after the publication of *The Origin of Species*, by Charles Darwin. Since

1861, the year in which he received a copy of this book, his investigative effort derived from his argumentation in favor of the theory of evolution.

Still as a teacher in Desterro, he projects, in one part of the farm where the *Lycée* was built, the creation of a small Botanical Garden. He collaborates with seeds and specimens for this small Botanical Garden and for the National Museum, with replicas that ended up being transplanted to the Botanical Garden of Rio de Janeiro. After the school's renewal, Fritz Müller was prevented from exercising his role of teacher without, however, losing the employment bond. Thus, he could propose to the government the creation of an experimental field on the margins of Itajaí river for planting and cultivating exotic species of the flora that were useful to the country, an activity to which he was designated in 1867. [6] Later on, his collections, scientifically argued and illustrated in detail, enriched the National Museum of Rio de Janeiro. The invitation to the post of Traveling Naturalist of the National Museum of Rio de Janeiro, which Fritz Müller held from 1876 to 1891, was made by Ladislau de Souza Mello e Netto, who was then the director of this Museum.

To contextualize the stage of the equipping process of the cultural and scientific institutions in Brazil, in the passage from colony to Empire, between 1807 – when D. João VI, at the time prince regent of Portugal, abandoned Portugal upon Napoleon's troops' invasion of the Iberian Peninsula, and came to live in Brazil – and 1815, the National Museum was instituted, as well as the National Library, the Fine Arts Academy, the Royal Press, the Bank of Brazil. Three generations of monarchs were necessary so that the Botanical Garden of Rio de Janeiro, also constituted by D. João VI in 1808, could form in 1890 its herbarium, with the donation of a rich collection of dehydrated plants that belonged to D. Pedro II. [7] The herbarium of the National Museum had preceded it – founded in 1831 by the botanist Ludwig Riedel, who participated in the scientific expedition of von Langsdorff from 1825 to 1829 in the country. The job that Fritz Müller had in the Museum between 1876 and 1891 coincides with the advancements of the institutions created in the consolidating Empire and the passage to a new administration of the already republican Brazil.

The conflicting view of nature in the colonization of the South of Brazil can be exemplified by Hoehne's testimony. In the volume dedicated to the coast of Southern Brazil, Frederico Carlos Hoehne [8] highlights the opposition between two words, fields and woods. As the director of the Botanical Institute of São Paulo, which he had founded, a post he held between 1942 and 1952, Hoehne planned to pay homage to Fritz Müller in a singular way, not with a statue to be erected in the urban space, but attributing his name to one of the rough-hewn trails in the lands of the Botanical Institute that still need to be demarcated at the time. He believed this would be a fairer homage than dedicating to him the name of a street or urban square, "in which the completely banished nature cannot establish anymore the relation between the person who has been honored and the reason for the homage." [8] The trails should be "a practical school of botany," [8] immersing the observer and exempting the help of the master.

To Hoehne, the two illustrious figures of the history of colonization of Alto do Vale do Itajaí in Santa Catarina, Dr. Blumenau and Fritz Müller, were opposites. In Dr. Blumenau, Hoehne saw the disciplined obstinacy of a persevering explorer and administrator, an educator, a "man of material initiative." In Fritz Müller, he saw the consolidated scientist who had "the forest as his favorite book", although *The Origin of Species*, by Charles Darwin, was one of the volumes of his extremely reduced library. What determined that his observation became a scientific investigation? What were the implications of having the forest as experimental practice of the observation of phenomena in their complexity? Between the fields and woods, he was thus described: "in the fields, barefoot, wearing a large straw hat, sleeves

rolled up, hoeing weeds from the cornfield, pruning the orange grove, [...] by the Itajaí river or in the woods, collecting insects, observing birds, plucking plants.” [8]

The interdependence between flora and fauna observed in the forest is different from the one observed in the fields and in the garden. Between the forest, the fields and the garden there are different degrees of nature domination, which reduce the complexity of the relations and show the advance of colonization. Knowledge extracted from these collection places, which were Fritz Müller’s laboratory, would have to differ from knowledge produced in the academies’ laboratories.

The garden was the live inventory of his correspondence exchange with European scientists. The proximity to Fritz Müller’s house enabled the monitoring, at different times and seasons of the year, of the rotation of the stems of climbing plants or of the movement of leaves in the rain, and a more comfortable and speedy transposition of these data to his worktable – where he registered them with indexes and formats that were more reliable to science, and in long-lasting media. The fields, even with the utilization of cultivation methodologies, were, at first, the colonists’ subsistence area, with no greater economic ambitions.

The fields, with the felling of the forest and a clearing open in the woods, served the increasing needs of safety and communication of the inhabitants of the colony, which was becoming a city. It was part of the administrative project of domination and rationalization, which saw the native vegetation as a productive force.

In 2010, the REFLORA notice was opened for cataloguing and repatriating the Brazilian native species of the 18th, 19th and 20th centuries that are in two international herbariums. This initiative has strengthened and stimulated the creation of networks of researchers working with the inventory of the remaining flora specimens in the state of Santa Catarina. One of the aims of *Inventário Florístico Florestal de Remanescentes Florestais do Estado de Santa Catarina*, IFFSC – Forest Floristic Inventory of Remaining Forest Species of the State of Santa Catarina, is the update of the list of endangered species. The project expects to conclude, in three years, the mapping of the species that are in the herbarium of Kew Gardens, in England, besides others. Among the species catalogued in this institution, some were collected by Fritz Müller in the 19th century. Of the species planted in Fritz Müller’s garden, fruit of his investigation and correspondence with other foreign scientists, nothing is known. With the discussion about the changes in the Forest Code in Brazil, the trajectory of Fritz Müller’s life and work becomes of paramount importance for reflection. Transformation networks is the movement of the observation carried out in the periphery that is legitimized, as an abstract datum, in the calculation centers that promote an accumulation of knowledge, the surplus value of information. It is in the transformation network that intellectual control is exercised, and through it the centers are capable of representing phenomena that were previously out of their reach. The paper focused on the science network between the German colony in the south of Brazil and the center, with the European scientists and naturalists with whom Fritz Müller exchanged letters, and tried to map the plant specimens that Fritz Müller sent to Europe. The concept is employed in the paper to refer to the naturalist’s procedure in his observation of the phenomena in loco in the forest, and also to highlight that his observations could only be legitimized as science after the screening of the “transformation networks.”

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TRAVELOGUE: AUSTRALIAN FORUM PANEL DISCUSSION

MARK GUGLIELMETTI

The focus of my panel discussion centers on Artificial Life, as encoded in three-dimensional computer generated space (3D space), with a specific orientation on the view into the Artificial Life virtual “world”; this view is predominantly mediated through the virtual camera.

Introduction

“A rich history has prepared the way for Artificial Life to make sense” writes Stefan Helmreich, [1 pp.6] reminding us the various dimensions through which to consider the Artificial Life are many. The discursive frameworks that tend to frame Artificial Life include; biology, the genealogy of cybernetics, the history of twentieth century generative art, often economics [2] and, more recently in relation to Islamic Art. [3, 4] It is not without irony then that Artificial Life visualisation *itself* as a specific dimension of the moving image is a somewhat impoverished discursive field with few notable exceptions such as. [5, 6] Reflecting the state of discursive impoverishment is the number of Artificial Life artworks that specifically explore Artificial Life in relation to the grammar of the moving image; *Technosphere* (1995) by Jane Prophet et al and Nemirovsky’s et al’s *Emonic Environment* (2001-2005) are but two exceptions.

How the view into Artificial Life ‘world’ frames our perception of the virtual world is the concern of this presentation. Reframing Helmreich I argue, a rich history has prepared the way for us to *view* Artificial Life images; there are many visual grammars and interpretative regimes that inform our capacity to engage with Artificial Life virtual worlds. In a recent response to an abstract I submitted to a media arts history conference I was surprised to read one reviewer’s response; “The idea of the “virtual camera” in simulated settings is an interesting hold-over from the filmic world and deserves more exploration”. The response was unexpected for a number of reasons, which I address here. Firstly and pro-saically, the virtual camera is simply a de-facto protocol in all types of 3D simulation, filmic or not; it is the tool [7] or device through which to frame the image, window or view into 3D modeling software, VR simulation, FPS games, architectural visualisation, engineering simulation or, the artificial life virtual “world”. Secondly, I argue there is a ubiquitous regime and protocol in Artificial Life image making that draws from *both* science and cinema even if these normative practices are not explicitly obvious to the practitioners creating Artificial Life images. Finally, I argue Artificial Life image making draws heavily upon the interpretative grammars and strategies developed in the scientific nature film. In summary, this paper outlines provisional research that situates Artificial Life visualisation, science and art, in both; the interrelated genealogies of scientific visualisation and cinema and, within a particular discursive orientation traced to Disney animation and nature films.

Science and the ‘long take’

Whilst much research energy has focused on computational techniques to generate lifelike behavior and emergence (Langton) the scopic regime through which to view artificial life “worlds” helps gives rise to the key themes of emergence and “lifelike behavior”; there are interpretive fields through which to *view* Artificial Life worlds. The scopic regime in Artificial Life visualisation is a “hangover” from scientific observation, vis-à-vis devices such as the microscope and telescope, *and* from film/cinema, vis-à-vis Andre Bazin’s device “the long take”; the perception of an uninterrupted view of the world underwrites

both the *arts of reality* [8] and Bazin's long take. Scientific objectivity and the long take function to 'record' an unmediated reality; this reality gives rise to the idea that one looks through a window into a 'world', in this context through a window into an Artificial Life world and not at an image of Artificial Life (albeit there are exceptions).

The idea behind the virtual camera is embedded in the genealogy of analogue devices such as the microscope and telescope; the virtual camera impassively enframes the 'world' whilst it simultaneously optimizes the credibility or factuality of the 'world'. Moreover, similar to a photochemical camera (still or motion) the virtual camera 'records' or documents a temporal image of the 'world'; in other words the virtual camera approximates Vertov's "microscope or telescope of time." [9 pp.213]

There are a number of ideas at work here worth considering. Firstly, the camera is employed objectively; as we know objectivity forms a tactical and an interpretive regime.

Secondly, similar to analogue telescopes and microscopes, the virtual camera operates in and is operated on in the 'present tense'; Jenna Ng is instructive here observing that the long take also functions not just to record reality but *presentness*; Ng writes, "Pier Paolo Pasolini attributes presentness specifically to the long take as it is the shot which takes in the greatest amount of reality, and "reality seen and heard as it happens is always in the present tense": "the long take, the schematic and primordial element of cinema, is thus in the present tense. Cinema reproduces the present" [10 pp.133-134] or in the words of the film Director Aleksandr Sukorov's in describing his film *Russian Ark*(2002) "the present continuous." [Sukorov in 10 pp.123] This present continuous has special resonance in Artificial Life image making; with few exceptions the key to Artificial life's *emergence* [11] involves evolving *live* to a "global audience" (Scott Draves <http://electricsheep.org/>).

Thirdly, the virtual camera is routinely considered as a window into a 'world'. Unlike analogue telescopic, microscopic and, photochemical images which are indexical to the physical world, in the case of photography and film they record imprints of light from the world, [10, 12] Artificial Life 'worlds' are not indexical to the physical world, they are isomorphic to a specific computer model. Moreover, the computational models are mathematical expressions that *interpret* the physical world; they are neither indexical nor isomorphic to the physical world. Like all digital images Artificial Life images don't 'represent' the physical world, digital images encode information and "computers produce tokens of *numbers*." [12 pp.131] That "Images are mediations between the world and human beings" [5 pp.9] is a important reminder that an image is not a window into a world it is an image. This point is critical when framed against the very premise of artificial life, which is predicated on "generating *lifelike* behavior [... and] focuses on the problem of creating *behavior generators*." [11 pp.5] Frequently, the success Artificial Life visualisation is dependent on observing or deciphering emergent patterns in the 'world'; what is perceived in the world or on the screen is what there is to perceive. According to Flusser transposing the act of looking at an image into the act of looking at or into a world is "dangerous" business:

What one sees on them [technical images and by extension images created by the virtual camera] therefore does not appear to be symbols that one has to decode but symptoms of the world through which, even indirectly, it is to be perceived. This objective character of technical images leads whoever looks at them to see them not as images but as windows. Observers thus do not believe them as they do their own eyes. Consequently they do not criticize them as images but as ways of looking at the world ... [this] lack of criticism of technical images is potentially dangerous at a time when technical images are in the process of displacing texts – dangerous for the reason that the 'objectivity' of technical images is an illusion. For they are – like all images – not only symbolic but represent even more abstract complexes of

symbols than traditional images. They are metacodes of texts which ... signify texts, not the world out there. [5 pp.15]

The problem with technical images, from art or science, is what you see is *not* what there is, what there are, are highly sophisticated models and concepts that require decoding and the virtual camera is strategically organized to impassively enframe these encoded models.

This account of the virtual camera in Artificial Life has particular resonance with the status of photography and film, from science and art, in the late nineteenth and early twentieth century; “Photographic images, according to the skeptic, were the automatic product of a machine, not of a mind” [13 pp.8] that is, the photographic machine “automatically [reproduced] whatever [found it’s] way in front of the camera lens.” [13 pp.9] The skeptical accounts were later confirmed in the *actualités* or documentary films of the Lumière Brothers [13 pp.9] and exquisitely represented in the photographic work of Karl Blossfeldt, a pioneer of the “New Objectivity” movement in the early 20th century. [14 pp.5-22] As is apparent in the images created by Blossfeldt, the framing of the ‘world’ is a tactical account of ‘reality’, an account that does not automatically record the natural landscape but frames it through various apparatus. Blossfeldt’s formal grammar is often manifest in artificial life image making, for example in Karl Sim’s *Galápagos* (1997) series and in Jon McCormack’s elegant study of the “computational sublime” in *Bloom* (2006) see http://www.csse.monash.edu.au/~jonmc/projects/Bloom/Bloom/bloom_main_page.html.

Disney Animal Animation and the Nature Film

A common feature in Artificial Life research, art and science, is the accompanying publication describing the research. The published material often includes both a description of the target system and a stylized fictional description of the system; the word “world” is such a stylized, rhetorical, descriptor. The beautifully evocative description of the homeostatic simulation *Daisyworld* (1983) suffices as a demonstration; published in the scientific journal *Tellus Series B: Chemical and Physical Meteorology*, the account reads; “Owing to a subtle change of climate, clouds appear on daisyworld. The clouds are light in colour. We will assume that the clouds form only over stands of black daisies because of the rising air generated over these warm spots.” [15] Obviously, stylized descriptions have properties that the models don’t. [16] These stylized accounts of the ‘worlds’ that describe ‘natural’ systems are nature stories, stories that would not appear out of place in David Attenborough’s *Life* series (1979-2010) nor in Disney nature stories.

The fictive re-imaginings of Artificial Life ‘worlds’ have much in common with the nature or wilderness stories popularized by Disney in the 1950s and 1960s and other production units in the 1970s, which re-told stories of a mythic “western interior” as natural ‘progression’ and, anthropomorphized the subject matter. [17 pp.117-120] The similarities between the Disney stories and artificial life narratives, in how they both organize ways of thinking about the world through retelling of ‘eternal’ stories of birth, death, cycle, pattern and adaptation (progression), are many. Compare, for example, the role of the 1950s Disney filmmaker and Artificial Life practitioner; the filmmaker captures or “shoots” something on film and the Artificial Life practitioner captures life in the computational ‘world’ using the virtual camera, both are on the metaphorical hunt for the ‘novel yet familiar’ exotic life form in an ‘undiscovered land’. And similar to the Disney stories that did “something far more than reveal “nature’s mysteries”: [... and] spoke to us of a living and intelligible world beyond the fence of civilization, a world we could enter at will and experience in something like human time” [17 pp.118] Artificial Life proposes a comparable arrangement.

Whilst the reader might find the relationship between the Disney nature film of the 1950s and artificial life unpersuasive consider the 1993 commissioned report by Ars Electronica in which the author of the report, Roy Ascott, details the demarcated exhibition spaces at Ars Electronica. In a provocative gesture “Walt Disney, animal animations” are included as ‘artists’ in the “Artificial Life” section of the Ars Electronica exhibition. [18 pp.296] My reading of this provocation is twofold and interrelated; Disney animations and nature films attempt to simulate the ‘laws of nature’ - Disney animation “follows the laws of physics — unless it is funnier otherwise” observed Disney animator Art Babbitt whilst Disney nature films attempt to simulate life as we know it vis-à-vis the moral and political refractions of life as it is and life as it could be. Disneynature, the division of Walt Disney Motion Pictures Group that specifically releases Disney nature documentaries, renders explicit this interrelation between Disney animation and Disney nature film. Disneynature’s latest blockbuster *African Cats* (2011) is “An epic true story set against the backdrop of one of the wildest places on Earth, “African Cats” captures the real-life love, humor and determination of the majestic kings of the savanna [...] the story features Mara, an endearing lion cub who strives to grow up with her mother's strength, spirit and wisdom [...] Fang, a proud leader of the pride who must defend his family from a rival lion and his sons. Disneynature brings “The Lion King” to life in this True Life Adventure... An awe inspiring adventure blending family bonds with the power and cunning of the wild”. (<http://disney.go.com/disneynature/africancats/#story/>)

Artificial life ‘world building’ is located in this trajectory of nature storytelling; cyberbeasts, virtual organisms and, agents are optimized in a similar vein to Mara, Fang and other ‘big cats’ to fight, breed, and die; moreover we observe them as they carry out the real life drama on the fitness landscape. This relationship between artificial life and the nature film is a theme repeated in artificial life researcher Terzopoulos’s conceptual framing of his artificial life work, for example in his paper *Artificial Life for Computer Graphics* Terzopoulos writes “computer animators can begin to play a role less like that of graphical model puppeteers and more like that of (National Geographic Society) nature cinematographers.” [19]

Artist and writer Michael Punt writes, “the gap between science and entertainment is much smaller than imagined. The interaction and exchange might occur not only in shared technologies but in the very imagination that seems necessary to negotiate our consciousness of the world as complex and ultimately unknowable. Science in narrative cinema and the cinematic in scientific research do seem to function reciprocally to help account for difficult things, providing images, metaphors, and useful descriptions for each other.” [20] Punt’s argument is clearly illustrated in Jon McCormack’s *Turbulence* (1995). Described by the artist as “a menagerie of synthesised forms, evolved within the computer using a process of artificial selection. A video laserdisc contains over 30 minutes of computer generated animation” [21] *Turbulence* is a series of pre-rendered animated sequences that are selected and viewed in no particular order. Whilst McCormack wrote the code to “allow certain algorithms and their graphic progeny to flourish through a recursive process of digital “procreation,” and to terminate others—a case of survival of the aesthetically fittest” [22] the overall experience is expressed through the conventions of cinema as the user/viewer watches the pre-rendered movie files; the camera shots are composed by the artist director and; the narrative arc, regardless of the viewing order, reworks the story of Genesis creation or a “post-Fantasia reprise.” [22] In the words of Michelle Barker “In the end what we see is closer to a narrative cinematic experience complete with sound track.” [23]

Closing Remarks

In Artificial Life image making, a constellation of grammars from science and film are assembled as constituent of a particular 'natural order'. Whilst this 'natural order' appears benign it is important to remember the 'natural order' in Artificial Life is neither neutral nor impartial; the capacities required to engage and interact with the metaphors, models and techniques of artificial life are cultural and political, they are recruited, so to speak, into Hayles' posthuman world [24] in which the machine becomes the model for understanding the human.

At stake in Artificial Life screen based 'worlds' or images is agency both in the terms of the Artificial Life-form and being human; instead of looking *at* animats, virtual pets or "cyberbeasts" perhaps we should consider looking *through* the Artificial Life forms point of view. Virilio's somber observation; "Once we are definitively removed from the realm of direct or indirect observation of synthetic images created by the machine for the machine instrumental virtual images will be for us the equivalent of what a foreigner's mental pictures already represent: an enigma" [25] and Cubitt's astute observation, "Machine perception and human perception are co-dependant and must co-evolve"[26 pp.108] are nice bookends to this topic.

"AI Life" researcher Margaret Boden argues, "An idea can be "possible" or "impossible" only with respect to a specific conceptual space. It is possible if the rules for generating new structures allow for it; impossible if they do not. The more clearly we can map the conceptual space, the better we can identify a given idea as creative, in this way or that." [27 pp.269] If I understand Boden correctly she argues that an idea (as creative) is possible within a specific "interpretive regime", an idea transmitted through a specific dispositif vis-à-vis structures of knowledge, discourse and power. It is through the institutionalised apparatus that I understand Cubitt when he states "Computers will talk to anyone, but only the wealthy teach them to speak, to define what perception might be and what is interesting." [26 pp.47] The irony is this; in a contemporaneous media saturated landscape in which the "new space of mediated vision is post-Cartesian, postperspectival, postcinematic, and posttelevisual," [28 pp.7] artificial life screen based work tends to orient around a single stationary view into the virtual 'world'.

Acknowledgments

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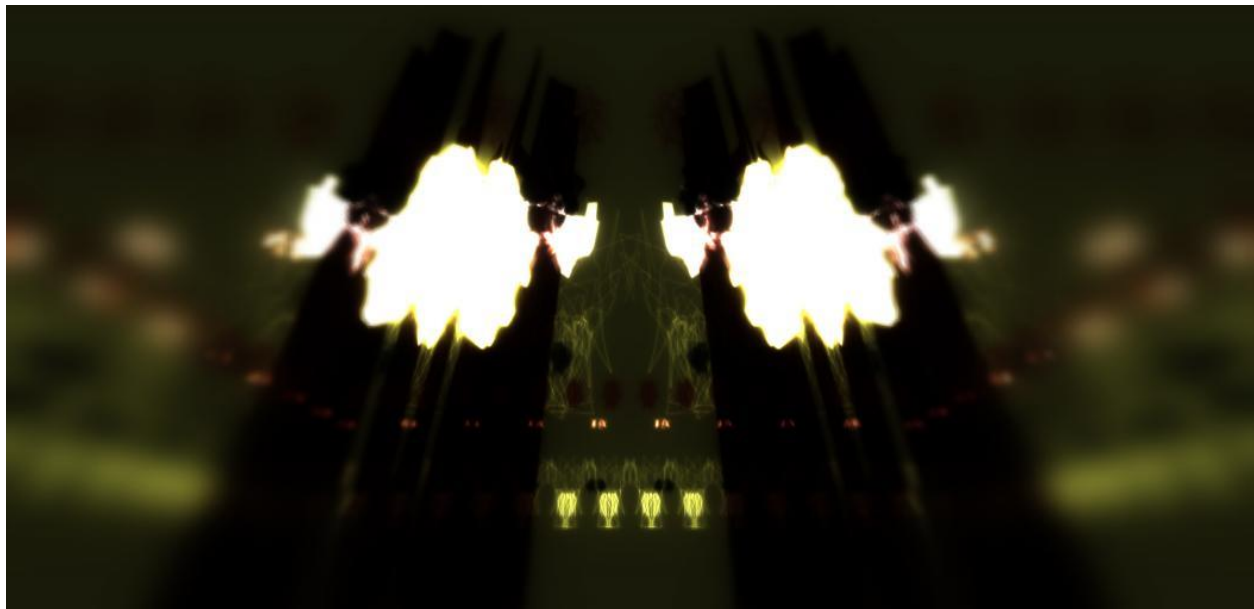
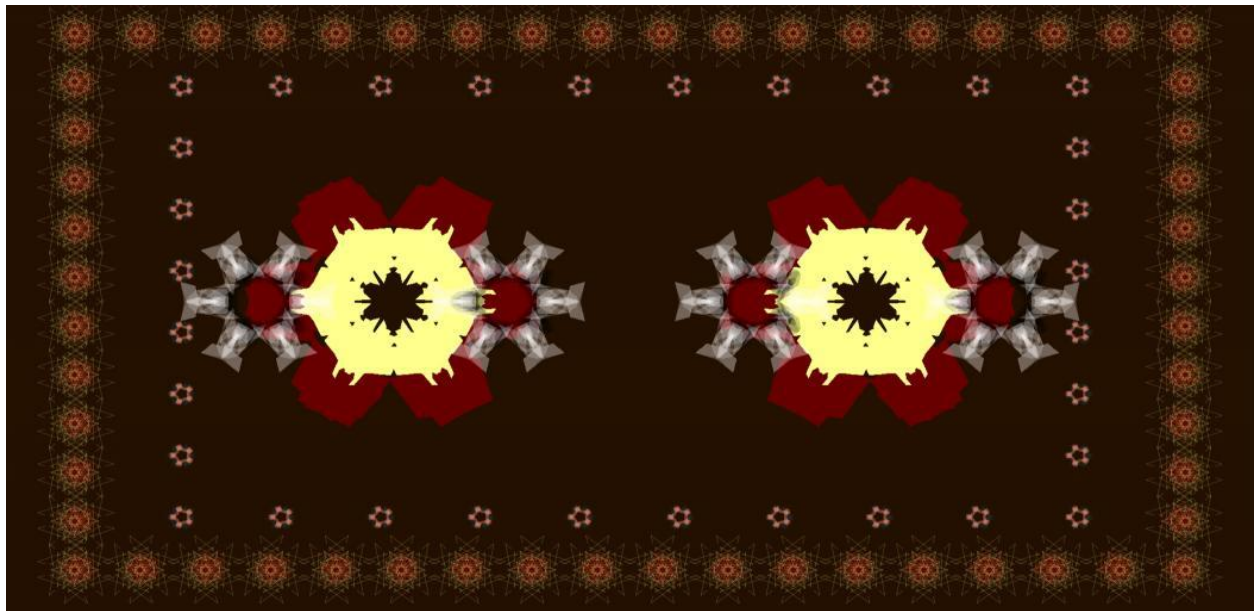
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TRAVELOGUE: THE EXPRESSIVE POTENTIAL FOR AN A-LIFE FILMMAKER

MARK GUGLIELMETTI & INDAE HWANG

Travelogue: a recording of minute expressions explores the expressive processes of film and A-Life to propose co-evolving an A-Life world with an artificial filmmaker to evolve a documentary of 'interesting things'. The paper frames the research and examines the potential to expand both the grammar of film and A-Life to evolve a new visual syntax and to create new logics for transitions and alternative visual/thematic analogies.



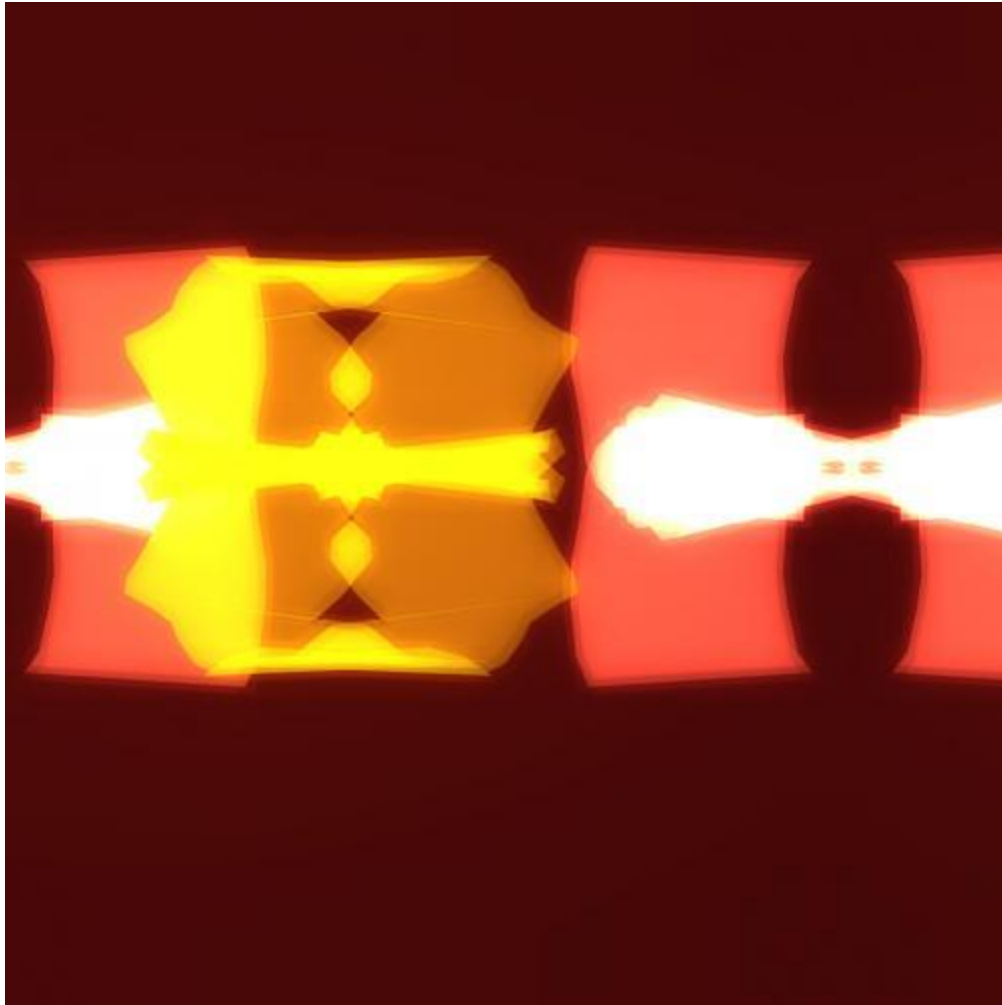


Figure 1-3. *Travelogue: a recording of minute expressions*, 2011, Mark Guglielmetti in collaboration with Indae Hwang. Software, code. Copyright the artists.

INTRODUCTION

The term ‘artificial life’ (A-Life) and Langton’s often-cited trope to locate “*life-as-we-know-it* within the larger picture of *life-as-it-could-be*” are beautifully evocative and provocative, as are the descriptions of the occupants of these “virtual worlds”; such as Sommerer and Mignonneau’s “creatures”, Jane Prophet’s “cyberbeasts”, and Karl Sim’s “virtual organisms.” These creatures, etcetera, often “live,” “fight,” “breed,” “trade” and “die” in the virtual world; that said, rarely do they “work,” “shop,” “cook” or afforded a ‘point of view’; sticky messy descriptions that, apparently, rarely pervade the imaginative and iterative loop of pattern generation. The anthropomorphic machinations of an A-Life “world” are usually described through the discursive framework and nomenclature of science and occasionally economics, more so than from a personal intimate perspective of life.

This institutionalised orientation is not exclusive to the nomenclature of A-Life as a journalistic enterprise for academic publications and as filter for the artist’s press release, but extends to other taxonomies of A-Life such as the interpretive viewing regime of the A-Life world. The normative viewing

protocol through which to view an A-Life world is predominantly through a "window" into the A-Life world; in 3D computational space this window is framed through the virtual camera view into the modeled world. Whilst there are a few notable exceptions, such as *Technosphere* (1995) by Jane Prophet, Gordon Selley et al, I argue there is a ubiquitous approach and standard protocol in A-Life world making that draws from both the practice of science, observation as *raison d'être*, and expressions from cinema, specifically Bazin's 'long take', even if these normative practices are not explicitly obvious to the practitioners modeling these 'worlds'.

Whilst the A-Life artist's vision centers on a range of poetic investigations and interventions, the aforementioned institutionalised discursive orientations and normative grammars are nonetheless political. Observation as a model occupies a long-standing tradition in the west for a social-cultural controlled search for natural order; how we see what we see as a spectator or user is important. [8] A number of A-Life artist's might dismiss this argument, however as Shanken demonstrates in his brief analysis of the *quadri riportati* and *quadratura*, the view into and of the world is critical; varied representational schemas reconfigure our perception and relation to the world. [10] In the case of the virtual camera, observation vis-à-vis the 'long take' stands in reserve as the de facto protocol which functions to record (shoot) an unmediated reality of the A-Life 'world', perhaps for good strategic reason; when "we abandon the notion of a camera as an adversary to the world ... and instead place the accent on its "natural" connection to the world, we reach another, more orthodox version of a camera. This approach stresses the necessary, scientific links among objects, light rays, and film emulsion [...] A camera comes the bearer of tokens from the world." [4] A natural order is established in service of scientific method; measurement, classification, documentation and re-presentation arbitrate fact from magic, facts are not man made, as Shapin and Schaffer observe "it is not I [the experimenter] who say this; it is the machine." [11] The apparatus of the scientific optical device, including telescopes, microscopes, the immobilized lens, in other words the *arts of reality*, [9] stand in reserve to observe and reaffirm a natural order; the virtual camera affords a strategic 'world view'.

During the "speculative pre-history of artificial life" [5] cybernetic artist and theorist Roy Ascott openly contested "deterministic vision" in art, writing; "The perception of our own times is more inclusive and panoptic; the simultaneity of events and their endless changeability have called for a depth of field that zooms from the microscopic to the macroscopic." [2] Whilst contemporary new media artists explore the "microscopic to the macroscopic" in an infinite array or indeterminate number (*n*) of expressions in software and hardware, including the virtual camera in A-Life's sibling Artificial Intelligence, the virtual camera in A-Life predominantly remains underexplored; the entire parameter space or *phase space* of the virtual camera in A-Life is up for grabs.

PROJECT DESCRIPTION

The project *Travelogue; a recording of minute expressions* is a hybridized visualization-generative-cinematic system exploring the tension between the microscopic and macroscopic, and it does so to examine a range of cultural grammars including; the scopic regimes of both the 'long take' and montage; representation and aniconism; narrative and visualisation; in other words, grammars of realism (without the ideology that underwrites much in A-Life, the biological metaphor). The work is rendered in real-time in three-dimensional software (3D space) and displayed as a multi-channel installation; at ISEA2011 the work is displayed in two 24" LCD monitors.

The central motif of the work draws inspiration from Islamic art including Turkish and Persian carpet making, see Figure 1. The motif strategically orients both the project and A-Life, including ‘emergence’ as *de rigueur and practice*, into the longer genealogy of the human enterprise. Whilst much is made of the critical role of emergence in A-Life, [12] the conception of emergence in art precedes A-Life in Islamic art and carpet making; Laura Marks observes, “both Islamic art and algorithmic media enact the emergence of Everything (or, A Lot) from One (or, Not Much).” [7] For Christopher Alexander emergence in A-Life is even more tightly connected to Islamic carpets in that the purpose of the carpet was more than to create a representation of life as it is but moreover to generate life as it could be in the “emergence of a being” or God; “*A carpet is a picture of God.*” [1]

The “world” in *Travelogue: a recording of minute expressions* is seeded or initialized with statistical census data on tourism in Turkey, September 2010; data from the “Monthly number of arriving foreigner visitors” provides the initial ‘resources’ to populate the work. Other data, such as “\$ spent per foreigner” and “Number of foreigners of Nationality and Group of age-gender” populate other variables in the system; these variables are used to mathematically describe ‘agents’ (expressions). During runtime the expressions “engage” with other expressions; this “engagement” is not visualized, reducing the capacity to anthropomorphize the system. The algorithmic transactions between expressions provide various resources to other expressions, which enable them to change scale, colour, location, number; similar expressions enacted in other A-Life systems without layering the expressions with slippery terms like “fighting” or “breeding”. The orthographic view into the work frames and gives context to the system; the resulting moving image might be described as a re-imagination of the *potential* enfolded tourist trade in Turkey but just as well be described as an expression of the system.

The second screen displays a view as expressed from the virtual camera in the “world”. The format of the virtual camera expressions draws from a variety of grammars from the moving image, such as montage, zoom, pan etc. but also novel expressions unique to 3D software space such as rewiring the virtual space’s *z-buffer* to reorganise the drawing logic of the virtual space in relation to the virtual camera, as discussed in Guglielmetti. [6] The virtual camera/filmmaker shoots or *nframes* what is ‘interesting’ to it; whatever that interesting is, is unknown to the author. See Figure 2-3.

The virtual camera in *Travelogue; a recording of minute expressions* does not attempt to capture or attempt to construct narrative as it is or narrative as it could be. Moreover, any attempt to reconfigure the project within a user-centered utilitarian approach found in some A-Life art [12] misses the point; this is a process-centered work that self-regulates the microscopic to the macroscopic. The virtual camera expressions resist, to limited degree, the “patterned clichés” enlisted as normative narrative protocols in addition to any claims to “realism.” [3] In other words the virtual camera functions as “an eye unrulled by man-made laws of perspective, an eye unprejudiced by compositional logic, an eye which does not respond to the name of everything but which must know each object encountered in life through an adventure of perception.” [3]

CONCLUSION

Travelogue: a recording of minute expressions is an initial and tentative foray into the potential for artificial life filmmaking with much predicated on the “virtual camera” in 3D space. The virtual camera is critical for this iteration of the project in that it simulates a fully functional *digital* camera; the virtual camera is an array of algorithms, some of which are mapped to functions that have equivalence in physical digital video cameras others specifically used for ‘post production’ effects, such as motion blur or glow. In

and around these technical constraints have developed various grammars of the moving image; for the purpose of ‘simulating’ a subjective point of view these grammars persist in *Travelogue*.

However, the virtual camera is host to a range of algorithms, such as the z-buffer, that specifically encode *3D space* and have neither correspondence in the physical world or in other software formats. The challenge for research into the grammar of artificial life filmmaking is to jettison the "camera" itself as the primary metaphor to describe the view into a 3D space; there simply is no camera. Meredith Hoy rightly observes in her ISEA presentation description for *Virtual Resistance: A Genealogy of Digital Abstraction*, “computationally generated pictures analogize and favor the visual qualities of a world seen through a camera lens”. Hoy’s statement has particular resonance in visualizing 3D space in FPS games, VR, machinema, artificial life, architecture and engineering. Any extended investigation into artificial life filmmaking for the purpose of creating a new syntax and visual grammar must include a closer inspection of the infinite array of views into the world for the purpose of re-compositing these views into a non-photorealistic rendering of the ‘world.’

This experiment into an extended range of capacities in A-Life imagemaking is inspired by artist and experimental filmmaker Stan Brakhage who understood what is at stake perhaps better than most:

the increased programming potential of the IBM and other electronic machines [are] now capable of inventing imagery from scratch. Considering then the camera eye as almost obsolete, it can at last be viewed objectively and, perhaps, view-pointed with subjective depth as never before. Its life is truly all before it. The future fabricating machine in performance will invent images as patterned after cliché vision as those of the camera, and its results will suffer a similar claim to “realism.” [3]

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THE RHYTHM OF CITY. GEO-LOCATED SOCIAL DATA AS AN ARTISTIC MEDIUM

Varvara Guljajeva & Mar Canet Sola

The paper introduces our approach for applying geo-located social data for artistic purposes, and elaborates on the related artworks. By describing The Rhythm of City we explain an innovative and artistic way for using geo-located data as a score in real-time. At the same time, the data represent a city's pace of life. We stress the malleability of the digital world to the physical one, and the interpretation of social data for artistic purposes.



Fig 1. The Rhythm of City was exhibited at Enter5 in Prague. Copyright Varvara Guljajeva & Mar Canet Sola.

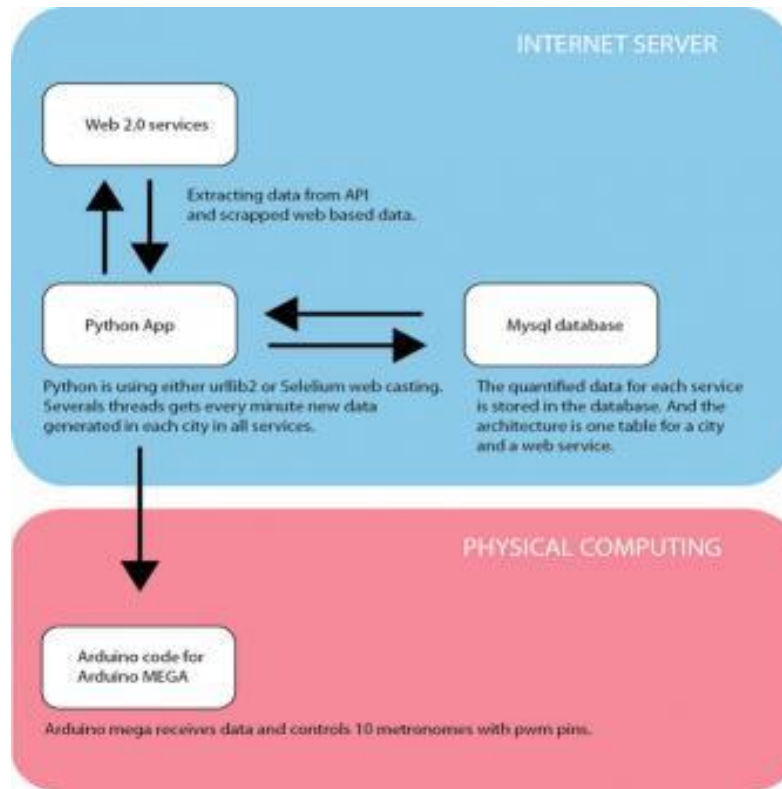


Fig 2. The software architecture of The Rhythm of City. Copyright Varvara Guljajeva & Mar Canet Sola.

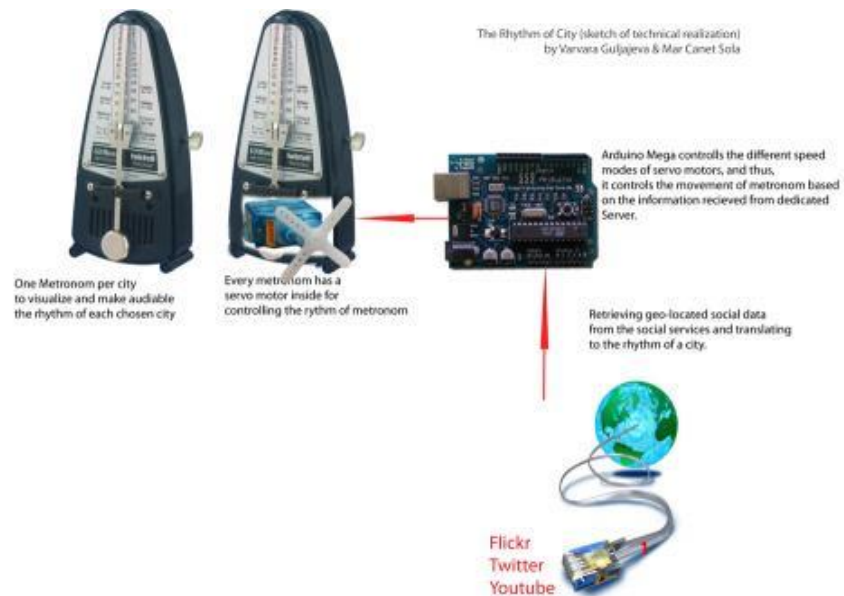


Fig 3. Technical realization. Copyright Varvara Guljajeva & Mar Canet Sola.

INTRODUCTION

Starting with the inspiration for the project, Bornstein & Bornstein discovered a positive correlation between the walking speed of pedestrians and the size of the city. [14] Robert Levine [10] demonstrated the faster pace of life in the northern, economically developed and individualistic countries in his study. In short, the investigations proved that it is possible to describe a city and its' culture by the speed of inhabitants and services, and its location.

Consequently, we assume that the digital geo-located social data can give us similar results: in economically developed countries bigger cities generate more digital social content rather than the cities of undeveloped countries. In other words, we believe that the analyses of geo-located social data will give similar results as have achieved Bornstein & Bornstein and Robert Levine. Thus, the aim is to artistically relate to these studies.

Our assumption is based on numerous facts and writings. First of all, the society is going through the digital revolution and we are living in the information age. Social media has gained an important role in our lives. Kristie Fisher and Scott Counts state in their paper that the relevance of social software is already comparable to the older media like books and television. [5]

In addition to that, location-aware ubiquitous and mobile technologies allow us instant participation in digital social networks. For example, Twitter has announced "182% increase in the number of users tweeting from mobile devices in the past year." [9] That brings us to a conclusion that social media are well received and extremely used by the society. The usage of Internet is much more than the source of information nowadays. Social media are extremely engaging by encouraging socialization and expression of own thoughts, moods, and reporting on the events. Thus, it can be claimed that microblogging and upload of various media is becoming an integral part of social life.

Fujisaka, Lee, and Sumiya state in their paper that a significant part of population is sharing its' daily life and social events through microblogs, like Twitter. Even more, the growing usage of mobile devices makes blogging more popular and accessible. It means people are reporting about happenings, their activities, feelings, etc instantly. [8] The authors refer as well to the fact that it is possible to make sense of the microblogs' data. Although the messages on Twitter are short and have limited information, many researchers are looking for a set of mass movement that allows "discovering interesting and useful patterns such as social/natural events or social customs/culture." [8] All this is possible because of a location and a time-stamp that are involved into many posts in social networks. As well Kristie Fisher and Scott Counts see Twitter as "a very large and rapidly changing information source." [4]

Drawing on these facts, a city's culture, events, and pace of life can be observed by analyzing the geo-located social data. Paul Virilio concludes following: "a virtual reality that dominates the reality while disturbing its own idea of 'reality'." [13] Therefore, it is inspiring for us as artists to use the data of social media as a material in our artistic practices. Moreover, it allows us to reflect upon the phenomenon of hybrid virtual-physical world and provoke discussion.

CONCEPT

The Rhythm of City has a multifaceted concept. First of all, geo-located data are translated into the mechanical rhythm of a metronome. The same rhythm represents a city's pace of life. Second, there is a twist from digital to physical. The digital data are translated into physical kinetic motion and mechanical sound. Thus, the meaning of information has been altered and applied for totally different purposes. The same has happened with a metronome – the device has been given totally new and unexpected function from its' original one.

And finally, the users of geo-located social media are influencing the rhythm of a metronome in real time. It constitutes that The Rhythm of City is an installation that can be viewed as an open work, which score is dependent on geo-located social data. As well the work goes under real-time art according to Jeffrey Crouse. [6] He states that this kind of genre of art comprises two distinct parts: the information source(s) and the work it self. The art piece on its own gives a new frame for the data source, and at the same time, alters the meaning of it. Hence, the information does not stand for the information anymore, but for something totally different. In the case of The Rhythm of City the geo-located social information of sources are transformed into a rhythm of a metronome in real time. On the other hand, The Rhythm of City can be seen as mixed reality installation because it crosses and blurs the borders of virtual and physical spaces.

In addition to that, the artwork can be viewed as a representation of a city's pace of life. In other words, the tempo of a metronome is an interface of a city. Through observation one is able to make a conclusion on the tempo of life in certain city and compare different locations between each other. Hence, the installation can be perceived as a performance by 10 metronomes representing different cities but also one is able to observe a single metronome and listen to a specific city (Fig 1).

When it comes to our inspiration for using metronomes, we were greatly influenced by György Ligeti, who composed "Poème Symphonique for 100 metronomes" in 1962. [12]

Ligeti's work is a relevant reference in terms of score composition and applying a mechanical object as a musical instrument. In addition to György Ligeti, many other Neo-Dadaists and Fluxus artists, like John Cage, Eric Andersen and many more, were looking for new forms of score and art in general. Chance played a significant role in their works often. Basically they treated an art piece as a field of possibilities that underlined the role of chance and choice. [2] We see a number of parallels between The Rhythm of City and the early works that used chance and choice as an integral part of the composition. It constitutes that the geo-located social data play a role of chance in the composition. The important difference is that the tempo of metronomes goes beyond chance and adds cultural meaning. Moreover, the work builds a bridge between virtual and physical spaces, and thus, is a manifestation of networked society and digital age. As Lazlo Moholy-Nagy puts "art crystallizes the emotions of an age; art is mirror and voice." [1] Hence, we are making use of modern technology in order to explore a new possibilities and forms in contemporary art, and to reflect upon the networked age.

REALIZATION

In order to achieve the most accurate rhythms of cities, multiple social networks as the sources of social data are used. According to the selected cities the recent geo-located social data from Twitter, Flickr,

and Youtube are retrieved every minute. Thus, for each location the score is composed periodically. It is a combination of recent social activities in the three social networks.

In short, the software robot of The Rhythm of City gets the number of posts from the social platforms in the last minute and converts it into the rhythm of a city proportionally based on the current trend. All this is repeated every minute (Fig 2).

Explaining the dedicated software, the application was developed in Python. The specific programming language was chosen because Python is an optimal solution for creating web crawlers. Web crawlers is a software-based search robot, known as well as web-spider that analyses web according to the target. In this case, web crawlers is looking for the social data appeared in the last minute on selected social services and afterwards counts the new input. The query of search robot is location specific. It means the program is looking for the new social data only in the declared cities.

The database was created in MySql for storing the information gained from web crawlers. All location specific values that are used for generating the rhythm of each metronome are placed into the database. The database is used as well for storing the historical data of each city in order to understand the local activity within the social media networks. It means the rhythm of every city is compared to its' historical data periodically. Hence, we are normalizing the data of each location in order to ensure accuracy of the rhythm. The quantified data is then returned to Python application that forwards the rhythm value of each metronome to Arduino every minute.

Continuing with physical part of the project, it consists of modified metronomes and a microcontroller. Arduino (microcontroller) is connected to dedicated computer in order to obtain the scores of the metronomes every minute. The score from 0-255 is translated to the different rhythms by ArduinoMega and forwarded to the servomotors.

The metronomes used in the installation are modified: inside each of them is placed a servomotor that is realizing the tempo of metronome sent by the microcontroller (Fig 3).

LIMITATIONS AND REASONS FOR APPLYING CERTAIN SOCIAL NETWORKS

Twitter, Flickr, and Youtube were selected as data sources for several reasons. First of all, these social services are widely used all over the world and have been applied for describing epidemics and other social events in several studies. [8] Therefore, the score that is a proportional combination of users' activity within these social networks is reliable and realistic for representing the rhythms of cities. Moreover, the project is one of the few ones that apply a combination of data sources and evaluate their importance. Normally just one source, for example Twitter, is applied for extracting and translating social data.

The second reason for selected specific social application was available search by a city. For example, Google provides the geo-located search by country only. Opposite to Google Twitter, Youtube, and Flickr support search by city in real time and therefore were applied in the project. However, it is possible to expand the number of used social networks. For example, Wikipedia could be considered as an additional source for the score calculation.

Concerning further limitation, it is important to point out that certain social networks are banned in some countries. For example, Youtube, Twitter, Facebook, Google and some more web sites are totally or partially blocked in China. It constitutes that it will be difficult to include any Chinese city to the installation.

RELATED WORKS

The explosion of web technology and digital culture continue to be an inspiration for many artists. Moreover, virtual social environment is applied as an artistic medium often. For example, Julian Popp has produced amazing artworks based on his significant exploration of digital culture and real-time web as an artistic medium. Bit.Fall is an installation that displays the most popular keywords of current online news. The words, extracted from digital sources, can be read only for some seconds while the water drops are falling. [11] An art piece from 2003 by Jonah Brucker-Cohen called PoliceState, is another example for applying digital data as a concept and a medium that affects physical matter in real-time. The artwork points out the fact that certain governmental organizations, like FBI, are snooping users on Internet. The artist has developed a software script that makes use of the data being “snooped” by the authorities and turns it into the radio signals that control the toy police cars. [3]

Urban Mood by Mahir M. Yavuz is another project that uses geo-located tweets in order to describe the mood of a city. A single word that is a summary of a post is projected for a minute before displaying the next one. [15] The installation remains in the digital environment. However it demonstrates well how geo-located social data can be used for artistic purposes within the virtual space.

The next related example is News Leak by Timothy Devine, Jamey Cochrane, and Shervin Afshar. In the similar way as The Rhythm of City News Leak brings together virtual and real world by extracting local online activities from Twitter, Flickr, and Google News; and publishing the social data as a kind of instant publication in public space. In short, the authors are collecting geo-located data and giving it a form of publication as soon a person press a button of a dedicated box. [7]

To sum up, there are a huge number of arts, who apply social media as a concept and as well as an artistic medium. Interestingly there are much less artists, who make use of geo-located social data. And even less of creative people are concerned about transforming intangible geo-located social data into a physical form. There might be many reasons for that. First of all, technically it is not trivial tasks to analyze location-based social data and transform it into an artistic material. Second, social media platforms have a number of limitations and not all service providers are eager to share the data, like Facebook.

CONCLUSION

To sum up, The Rhythm of City is an inter-disciplinary artwork that demonstrates creative approach towards emerging social web technology. At the same time, the artwork draws attention to the vanishing border between virtual and physical, and allows perceiving a city’s digital pace of life.

In addition to that, the artwork introduces a unique experience to its’ audience. Suddenly it is possible to see and hear the cities’ pace of life that is performed by mechanical metronomes. The score is unpredictable and unique because the digital inhabitants are the composers of the score in real-time.

In conclusion, a significant amount of artworks that exist in hybrid space constitutes the increasing interests towards digital culture, and possibilities of real-time and location-aware web. Hence, the borders of electronic art are widening rapidly.

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FROM ASSISTANT TO PERFORMER: THE CHANGING ROLES OF TECHNOLOGIES IN DIGITAL DANCE

ZEYNEP GUNDUZ

The aim of this paper is to demonstrate that the integration of technology in the choreography of staged digital dance changes the role of technology into a performing element onstage and to a dance partner for the human dancer.

The performance takes place in the venue Fabrica in Brighton. The audience looks down from all sides of the theatre upon a square, white floor, which functions as a stage and as a screen. The performance begins with the appearance of three straight, short white lines on the floor. The lines move horizontally from the left to the right of the stage during which they extend in length. To the right of the stage, the three white lines converge to form a diagonal and then disappear. A moment later, a bright, white light illuminates the theater. The dancer appears on the left of the stage. She is sitting in a curled position. Similar to the lines before her, she too walks horizontally from the left to the right of the dance floor while maintaining her curled position. In the meantime, a white line traverses her body vertically and moves with the dancer to the other side of the stage. During this passage, the line moves forward and backward simultaneously with the dancer as she shifts her body weight forward and backward. Gradually, a second light appears onstage. This time the light forms a silhouette around the dancer's body and contracts and expands together with the dancer's movements. In addition, the silhouette intensifies its amount of light as the dancer intensifies the force of her movements, in particular the movements of her arms and legs. The scene ends with the dancer and the light next to each other. Each in their own way, they perform the same movement phrase (organized movement into units of time and space) while moving simultaneously in the same direction. At a certain point, the dancer stands still and watches as the white light grows to cover the entire dance floor, and then, slowly shrinks back down to a spot in the dark before disappearing.

The above paragraph describes the opening scene of *Glow* (2006), a recent example of a dance practice labeled digital dance. *Glow* is made by the choreographer Gideon Obarzanek and the media artist Frieder Weiss. Weiss's website promotes *Glow* as a "spectacular 27-minute duet for body and technology created with the "latest video-based real-time interactive technologies that operate with sophisticated motion-tracking software." [1]

Watching *Glow* left me feeling disoriented. Although simple, there is something peculiar about *Glow*'s choreography as a result of the replacement of one of the human dancers with interactive technology in its presentation of a 'duet'. To start with, the projected images are present on the stage throughout the entire performance. Therefore, the actions executed by the technology, perceived in the form of projected images, are over-exposed for the perception of the spectator. Second, the projected images play an active role throughout the performance in conjunction with the movements of the dancer. In turn, the movements of the dancer seem to complete the movements of the technology and vice versa. Hence, *Glow* seems to portray two different types of movement to be perceived onstage: human and technological. *Glow*'s choreography raises many questions: How can one dance with computer technologies? What is the role of technologies in this performance? And why do I feel so disoriented by watching *Glow*?

The second viewing of *Glow* made me realize that *Glow*'s choreography is peculiar because it does not fulfill my expectation of a dance performance, which is—in a strict sense—to see dancing bodies onstage. Technology, however, does not form part of my expectations from a dance performance. Rather, I perceive technology at moments in which technology creates a certain effect on the dancing body: for example, when side-lights add an extra lyrical effect to the movements of the dancer. Hence, there seems to be a certain hierarchy in my perception of a dance performance. In this ordering, the human body is of primary significance while technology seems to be of secondary prominence. Moreover, I realize that until this performance, I have paid little attention to relationships between dancers and technologies.

The integration of technology in *Glow*'s choreography, however, seems to unsettle this primary/secondary positioning of the human dancer and technology to which I am used to. The staging of technology in *Glow* requires a distribution of attention between the human dancer and the projected images provided by the technology. In fact, technology seems to occupy a role equal to the dancer's and it seems to function as a central element of the choreography. Although non-human, the central role played by technology leads to the unconventional idea that technologies may function as performers in the choreography, alongside the human dancer, in the sense of executing an act in front of an audience.

Historically, in theater, technologies have most often functioned to assist the performance and to direct the focus of attention to the performer onstage. An extensive description of the historical role of technology in Western European theatrical presentation is offered in the work of Christopher Baugh (2005). A key observation of Baugh's is that the assisting role played by technologies, in particular in the 19th century, has led to a neat division between the animate and inanimate elements onstage. Interestingly, Baugh uses a rather incidental expression to describe this division. The term he uses is "hierarchy of perceptual importance", and although in his text it operates as an incidental term, it seems to neatly conceptualize the clear division of roles he describes. [2] As such, and because of the relevance to the present paper, the term is adopted as a key-working concept in this presentation.

Baugh locates the roots of the hierarchy of perceptual importance in the changes in artistic values and infrastructural developments in theater in the 19th century. For Baugh, the changes that took place in theater in this era are highly significant because they led to a dominant understanding of the functioning of theater, in which the theater text and its mediation via the actor stands central. Technology, on the other hand, functions to assist the actor onstage or to enhance the dramaturgy of the art work. In fact, Baugh explains that the 19th century functioning of theater was so influential that it designates a paradigm in theater, which remained constant until it was challenged in two different eras in the 20th century. The first challenge came with the onset of modernist and avant-garde approaches at the beginning of the 20th century. The next most significant challenge to the paradigm of theater came in the last three decades of the 20th century, with the shift towards the postdramatic paradigm and continues to grow in strength. Nevertheless, despite these challenges Baugh writes that the paradigm of theater and its associated hierarchies are still widely understood in the domain of theatre and performance.

Artistic and infrastructural developments in the 19th century European theatrical dance presentation show many similarities to the developments in the 19th century theatrical presentation. Also in dance, the 19th century designates an important era in which dance as art form went through major artistic reforms in form and content, accompanied by infrastructural changes. Each in its own way, the shifts in the infrastructure and artistic status of dance as an art form in the 19th century can be seen to contribute to the hierarchy of perceptual importance in dance.

For example, whereas in the 18th century, the dancer had to make great effort to maintain the audience's attention, in the 19th century, the changing value of the dance as a serious art form, and the infrastructural changes in theatres, with a separation of the auditorium and the stage, demanded nothing else but the audience's full attention to the action, and thus, the human dancer onstage. Another strategy to keep hold of the audience's attention to the action onstage was to reduce changes in set design to a minimal level. As Alexander Bland explains (1976), at the start of the 19th century, in dance, stage design showed a tendency for simplicity and was not necessarily designed for tricks and surprise effects, which could distract the attention of the audience from the performance. [3]

In addition, in the 19th century, a shift in the status of the female dancer shaped the audience's perception to what they should be seeing onstage, namely, the dancing body. An important shift in the 19th century is the introduction of a star system and the rise of the female dancer. Although Bland points out that the star system could not have taken place if it was not for the invention of gas lighting that allowed the dancers to be individually noticeable by the audience, Selma Jeanne Cohen underlines that in the 19th century, "innovations in theme, in technique, costume" accentuated the artistic and physical qualities of the female dancer and they "all centered on her." [4] Moreover, the rise of the star system, with a particular focus on the ballerina indicates that the position of the human body onstage is even more stabilized and centralized, because the evaluation of the choreography is now to a large extent reliant on the performance of the ballerina, meaning the demonstration of her artistic and physical skills in front of an audience. In sum, the staging of dance in the 19th century implies a separation of the roles of the animate and inanimate elements onstage.

Moreover, the influences of the understanding of technology as assisting devices for the human performer, and thus a hierarchy of perceptual importance, can be detected in current studies on the role of stage elements in dance. According to stage designer Rouben Ter-Arutunian (2004), in most cases, technologies simply support the choreography and the physicality of the dancer as elements of stage design, such as lighting, costumes, and scenery. [5] According to this linear working mode of creation, first the choreography is created whilst the supporting elements, such as lighting or costumes, are designed when the choreography is finished. Hence, technology is not a part of the 'dance proper' but is considered as an additional element to give the choreography a final touch.

The division of roles between the human and non-human elements in dance can also be demonstrated by considering the words of dance scholar Selma Jeanne Cohen. Cohen describes the elements of standard theatrical dance as "a performer equipped with movement skills, a role to be played, a stage to lay on, music, costume, and décor to enhance the spectacle, an audience to respond to it." [6] Here, the performer is introduced as the primary focus and the other elements are introduced to enable or enhance the focus in one way or another, which, in most cases, lead to reduce the relationship between dancer and technology to a minimal level. In sum, the hierarchy of perceptual importance leads to the creation of certain roles and relationships amongst the human dancer and technology in the staging of the choreography.

This paper argues that the integration of technology in staged digital dance, [7] exemplified here with *Glow*, may represent a turning point in the understanding of the role of technology in dance as assistant devices to the human performer. The specific integration of interactive technologies in *Glow* cannot simply be seen as an extension of the conventional role of technologies as assisting devices in dance. Rather, this paper argues that, in *Glow*, technology functions on a higher level, as a performer, alongside the human dancer, which leads to certain shifts amongst the roles and relations in the involved parties within the cultural practice of dance. Due to restrictions, in this paper, I will focus only on the shifts roles

and relations amongst four parties during the creation of the choreography in staged digital dance: choreographer, media designer, dancer, and technology. By examining these shifts, I aim to show how technology functions as a performing element onstage and as a dance partner in staged digital dance.

STAGED DIGITAL DANCE

One of the most significant changes resulting from the fundamental role played by technology in staged digital dance is the introduction of the media designer as co-creator to the choreography, in collaboration with the choreographer. It is important to underline that, in staged digital dance, the media designer takes part in the creation of the choreography from the very start of the process. Hence, the introduction of the media designer as co-creator from the very beginning marks a difference of the artistic status of the media designer from that of the supporting staff, such as light designer. Whereas technology and other supporting stage elements are most often created when the choreography is finished, in staged digital dance such a linear and independent mode of working during the creation of the choreography is problematized. Hence, the status of the media designer as co-creator in the artistic process can be understood as a symptom of a change in the understanding of the role of technology in dance: no longer as a supporting device but as a central element in the choreography.

What follows, the introduction of the media designer in digital dance requires a shift in the position of the choreographer, which involves the distribution of the choreographer's creative authority. Richard Povall argues that the emergence of digital dance was possible within the context of a new "paradigm of collaboration." [8] For Povall, this newly emergent art form of digital dance fundamentally changes the distribution of power structures and roles both within the creation and the exhibition of the performance. Povall argues that digital dance performances require the choreographer to hand over the omnipotent role he or she enjoys in non-digital-technology based dance performances in favor of a more egalitarian, collaborative relationship primarily with a computer programmer. [9] This new paradigm, according to Povall, stands in direct opposition to the conventional working paradigm in which the supporting disciplines, such as the lighting or sound technician, bring their separate pre-designed parts to the table as and when the choreographer requires them to do so. [10] Translating Povall's points to the argument of this paper implies that technology no longer functions as an add-on in the creation of the choreography in staged digital dance. Rather, technology functions on a higher level, as a performing element in the choreography to the extent that it requires the expertise and creativity of the media designer, alongside the creativity of the choreographer.

The crucial role of technology in the creation of the choreography requires new ways of working from the choreographer and also from the dancer. Whereas in choreographic practices in which technology functions as a supporting element a basic knowledge of the effects provided by technology is sufficient, staged digital dance requires a more detailed understanding of the technical system from the choreographer and dancer. In turn, the thorough understanding of the technical system required from the choreographer and dancer signals the dissolution of the staging of technology and the human dancer in a non-relational manner within a hierarchy of perceptual importance.

Johannes Birringer (2008) states that, most often, the understanding of the operations of the technology necessitates additional training from the choreographer and the dancer. [11] The additional training required from the choreographer and dancer usually takes place before the rehearsals. It may take the form of workshops or informal gatherings in which the media designer demonstrates the technology to the choreographer and dancer. In the case of *Glow*, for example, choreographer Obarzanek and media

designer and programmer Frieder Weiss met before the creation of the choreography. This was necessary because it was important for Weiss to understand the choreographic concept that Obarzanek aimed to achieve. In the same manner, Obarzanek needed to understand the way the technical system operates as well as the aesthetic possibilities offered by the technology. For Obarzanek, this was necessary because just as one needs to get acquainted with the strengths and weaknesses of human dancers, one also needs to get to know the strengths and weaknesses of the technical system:

The system has an inherent quality to it and a particular way of existing. For me as a choreographer it was really important to understand that and work with that. For example, the system is never completely still and stable; it always has this little movement to it. [...] The technology brings a kind of 'frequency' into the choreography that you'd normally never really have in a dance work. It has an aesthetic-kinetic quality to it that is in the nature of the machine. [11]

Hence, for the choreographer the understanding of the operations of technology—its potentials and limitations—is necessary because it leads to effective collaboration with the technology, as a performing element in the choreography. It also demonstrates that technology is now understood as a dance partner for the human dancer.

In sum, in staged digital dance, it is important for the choreographer and also for the dancer to understand the operations of the technology because the potentials and limitations of technology shape the choreography to a certain extent. Erin Manning (2006) underlines that the use of interactive technology in dance results in a reduction of the quality and tempo of the physical movements of the dancer. [12] She explains that a fully actualized (visible and complete) movement is necessary for software detection, usually by accentuating the extremity of the body (for example, by prolonging the arm or leg movements) or a displacement of the whole body across space. Therefore, technology conditions the choreography because it generates a preference for fully actualized movements rather than small ones. Moreover, Manning underlines that video-based motion-tracking systems require the dancer to slow down the tempo of the dance movements because slow movements can be better tracked by the system.

Certain scholars, such as Manning, are critical of the integration of technology in digital dance because technology conditions the choreography and restricts the physicality of the human performer. Yet this criticism can also be read on a different level—that is how the integration of technology functions as a dance partner on the basis of its influence on the choreography. From this perspective, which is the point of view of this paper, the restrictions brought by the interactive system are useful to understand how technology functions as a dance partner for the human dancer.

Hence, with staged digital dance, the interrelation and interdependence between technology and the human dancer, which has mostly remained hidden from the perception of the audience in the history of dance, is laid bare in the aesthetics of the choreography for the perception of the audience. In digital dance, technology moves to the center of the stage, alongside the human dancer. Moreover, staged digital dance portrays human and technology in a dynamic relationship with each other. This implies that, within the art form of dance, we need to expand the evaluative criteria of performer and performance to include technology and technological performance.

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THE SPECTRE OF ANONYMITY

Seda Gürses

In dystopian debates on digital privacy, it is suggested that privacy can only be protected if we hide our personal information or practice control over it. In my paper I will look at the strengths and weaknesses of anonymity in each case, both as a technology as well as a strategy. I will also delve into its relationship to control, meaning how it evades and replaces different forms of control.

Anonymity is a powerful concept and strategy. It supersedes concepts such as authorship and origin, and manifests itself in our songs, poems, oral histories, urban legends, conspiracy theories, chain mails... For centuries, communities have used anonymity to articulate their collective voices. Anonymously produced statements or artefacts have expressed the cultural practices, beliefs and norms of the past, while creating a space in which to collectively build the future.

Anonymity allows the individual to melt into a body of many, to become a pluralistic one, for which the act of communicating a message is more important than the distinction of individual participation, be it at a demonstration or a football match. Yet, the seemingly unbreakable bond is fragile, since participation in the anonymous is fluid and is organized in a distributed manner. The anonymous perseveres only as long as the common line is held, hence at any point it may experience dissonance and simply dissipate. It is hence the volition of its participants that distinguishes anonymous groups from other types of collective bodies.

Anonymity is a means, never an end in itself, and can be utilized in unexpected ways. For example, in centrally organised forms of anonymity, e.g., military, corporation, participation in the anonymous is mandatory, individual actions are heavily controlled. The objective is still to protect, though the ones being protected are not necessarily the participating individuals but the existing power hierarchies.

The power of anonymity in communications has long been recognised by computer scientists and hackers. Anonymity is hence also a strategy on the Internet. So I ask, how is anonymity implemented, why, and by whom? What are its strengths and limitations?

'Anonymous communications' technologies like TOR, strip messages of any information that could be used to trace them back to their senders, so that a set of individual communication partners are not distinguishable. Observers cannot determine who is communicating with whom, so that individuals are protected against any negative repercussions resulting from such disclosure.

The architecture of the Internet makes it plausible to track the data bodies the users of the Internet leave behind, approximating all actions to their individual authors in physical space and time. These data bodies are open to scrutiny, dissection and re-use by collecting parties. By masking the origin, anonymous communications channels protect the individuals who authored these data bodies.

Despite the diversity of the groups and communities using anonymous communications, such technologies are usually cast in a negative light in policy papers and in the media. Anonymous communication

infrastructures are seen as providing channels for criminal activity or enabling deviant behaviour. But perhaps what bothers authorities most is not the fact of anonymity as such, but rather the user base and the distributed organization it relies on. After all it is obvious that data miners and regulators are keenly interested in systems that generate another type of anonymity, database anonymisation, a technique that is instrumental to the growing data economy.

The ideology behind the current data-driven economic hype suggests that the data collected will make the behaviour of populations more transparent, easier to organise, control and predict. Massive datasets are expected to reveal ways of improving the efficiency of markets and systems of governance, by applying statistical analysis methods to these datasets to infer knowledge. According to behavioural advertisers and service providers, these datasets will become 'placeholders' for understanding populations and allowing organisations to provide them with refined individualised services. In the process, elaborate statistical inferences replace 'subjective' discussions, reflections or processes about societal needs and concerns. The data comes to speak for itself.

However, collecting and processing such massive amounts of data is historically linked with a serious privacy problem. This is where database anonymisation provides a protection. The database can be manipulated in such a way that the link between any data body included in the dataset and its individual 'author' is concealed, while the usefulness of the dataset as a whole is preserved. If this is somehow guaranteed, then the dataset is declared 'anonymised'. Inferences can be made from the dataset as a whole, while ideally no individual participant can be targeted. This approach is endorsed not only by data miners, but also by regulators. The EU Data Protection Directive [1] includes a clause that frees anonymised datasets from regulation.

Once the link between the original author(s) and the message is broken and the message is released, it is likely to be subverted and reclaimed by others. This is one of the charms of the anonymous message: any individual or group can claim it as their own. But when a group subverts the message to negate all other linkages and continuities, monopolising the interpretation of the message's senders, destination and content, the relationship between 'the anonymous' and the message can get lost.

An example of this is given by Adela Peeva in her documentary film "Whose is this song?", [2] where she searches across the Balkans for the origins of an anonymous folk song. In each country or region she visits the song changes, becoming a love song, a song of piety, even a war song. Each variation comes with conflicting claims about the song's 'true' origins, all of which attempt to separate it from its nomadic past. The song is invariably re-shaped to uphold the local collective memory, as well as the community's future identity, in mostly not-so-subtle stereotypes: young Turks, amorous Greeks, proud Albanians, pious Bosnians, debauch Serbs, superstitious Roma, unflinching Bulgarians...

The film captures the dilemma associated with any anonymous action or artefact. Anonymity allows the articulation of a collective message. The message travels, free from the burdens of origin or authorship. However, this freedom is limited when a specific group claims the message as its own, and bends the message to suit its own interpretation of the past or future. The anonymous message can then boomerang to hit its collective authors: the hijacking of popular uprisings by a small group establishing its power, the re-writing of folk songs into chauvinistic hymns, or using anonymous actions as a pretext to introduce draconian security measures, are all examples of such de-contextualised anonymous messages.

In the data economy, the anonymised dataset becomes a digital mirror of the population's activities and tendencies. Organisations that hold a monopoly on these datasets assert their own categories of (un)desirable activities, in order to improve their markets and forms of governance. Since such datasets are anonymised and cannot be linked to individuals, privacy is supposedly intact (though anonymisation techniques provide no formal guarantees) and so the general population is not expected to question the ways in which the anonymised data is used.

We have seen how anonymity can be used to collectively protect individuals against Internet surveillance. But we must also recognise how similar strategies are being used to create discrete, decontextualised (yet linked) datasets that are essential to the data economy. We now have huge databases of 'friends' who rate, tweak and 'like' information which can then be used to guess our interests, desires, passions and weaknesses. The goal of the anonymisation of these databases is not to protect individuals, but to make it impossible for them to understand, scrutinise or question the ways in which these datasets are being used. We must cherish anonymity as a strategy for protecting individuals online, while rejecting its reincarnation as a tool to separate us from datasets being used to manage our lives.

Anonymity will always remain a powerful means of achieving political objectives and spreading collective messages. However, especially in political contexts, the vulnerability of the anonymous means that multiple strategies should be used to create a continuum of anonymously initiated activities. This includes making political statements that are explicit and precise, sometimes anonymously, sometimes not.

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2. *Whose is this song?*, dir. Adela Peeva, Copyright 2003, Adela Peeva.

FLOSS CULTURE

Adnan Hadzi

This paper continues the debate raised in the Next 5 Minutes media conference

FLOSS Culture

In 1985 Richard Stallman formulated an alternative to, some might say resistance against, the practice of locking away computer source code through the use of copyright: *The GNU Manifesto* (1985). In *The GNU Manifesto* Stallman advocates four major freedoms for anyone engaging with Free Software:

- 0) The freedom to run the program for any purpose.
- 1) The freedom to study how the program works and adapt it to your needs.
- 2) The freedom to redistribute copies so you can help your neighbour.
- 3) The freedom to improve the program and release your improvements to the public, so that the whole community benefits (1985)

Stallman went on to write the first 'copyleft' license, the General Public License (GPL), arguing for access to source code as a basic "human right", by paraphrasing the Bill of Rights of the United States stating that "the ethical response to this situation is to proclaim freedom for each user, just as the Bill of Rights was supposed to exercise government power by guaranteeing each citizen's freedoms" (2001). The GPL as well as the Open Source Definition (DiBona et al. 1999, p.171) are often referred as the roots of the 'copyleft' attitude, also applicable to non-software information, which in the hacker lexicon the jargon file (Raymond & Steele 2003) is defined as:

copyleft /kop'ee-left/ /n./ [play on 'copyright']

- 1. The copyright notice ('General Public License') carried by GNU EMACS and other Free Software Foundation software, granting reuse and reproduction rights to all comers (but see also General Public Virus)
- 2. By extension, any copyright notice intended to achieve similar aims (Raymond & Steele 2003)

Copyright asserts ownership and attribution to the author. Copyright protects the attribution to the author in relation to his/her work. It also protects the work from being altered by others without the author's consent and restricts the reproduction of the work. Copyleft is not an anti-copyright but rather an extension of copyright: it includes copyright through its regulations for attribution and ownership reference to the author. Nevertheless, it also extends copyright by allowing for free re-distribution of the work and, more controversially, the right to change the work if the altered version attributes the original author and is re-distributed under the same terms. A user can exercise those freedoms provided that s/he complies with the conditions of this license. I would argue that applying such copyleft licenses to media productions is a possible strategy for enabling media and arts practitioners to engage in collaborative production processes.

For the copy-paste generation, copyleft is already the natural propagation of digital information in a society which provides the possibility of interacting through digital networks. In doing so one naturally uses content generated by others, remixing, altering or redistributing it. At the same time the Debian project, an independent decentralised organisation of mainly computer coders, argues for 'copyleft' over 'public domain' as the latter is not a good alternative to copyright, "because some will try to abuse this for profit by depriving others of freedom; as long as we live in a world with a legal system where legal abstractions such as copyright are necessary, as responsible artists or scientists we will need the formal legal abstractions of copyleft that ensure our freedom and the freedom of others" (1997).

It is not only corporate companies who strongly enforce copyrights, but also established artists and writers who are afraid of losing their position: "Plagiarism and piracy, after all, are the monsters we working artists are taught to dread, as they roam the woods surrounding our tiny preserves of regard and remuneration" (Lethem 2007)^[2]. The fear of copyright infringement often derives, not only from producers and publishers who are making most of the profits from sales of intellectual property, but also from writers and artists fearing their 'bread and butter' will vanish if shared freely. Linda Smith even argues that copyright is an extension of colonialism. Smith explains that the 'project modernity' ended the absolutist society (feudalism), and it signaled the beginning of the 'modern' state. This new state system, being born out of the industrial revolution, had to fulfil the requirements of the ruling economic forces. According to Smith, a system of ideas started to focus on self-interest and on a state system that had to regulate a "public sphere of life" (2006, p.59)^[2]. With this system being accepted, liberalism and the ideology of individual autonomy and self-interest ideas could be discussed in academia, especially the 'scientific exploration' of the rest of the world by Europeans. The 'modernist project' was born with the systematic exploitation of indigenous people in the 18th and 19th centuries. "The production of knowledge, new knowledge and transformed 'old' knowledge, ideas about the nature of knowledge and the validity of specific forms of knowledge, became as much commodities of colonial exploitation as other natural resources" (Goonatilake 1982)^[2]. In *The Contestation of Code* Berry argues for an analogy between code and law:

As technology increasingly colonizes and structures more aspects of our lives it is becoming increasingly important that the constitutive nature of technology as socially shaped is recognized (Kesan & Shah 2002)^[2]. If computer code is analogous to law (Kesan & Shah 2002)^[2], then it is clear that without some form of democratic accountability the code-based regulation of human behaviour will continue to lack legitimacy (Habermas 1988)^[2]. It is ... an important challenge for wider society to recognize that values are being instantiated within technological forms that can and should be contested before they become sedimented. (2004, p.83)

In that regard intellectual property (IP) law seems to be a romantic idea for authors of computer code, but more and more also for authors of texts, as well as media and art productions, because most authors have become nothing other than employees, the profits go to the software and media moguls, and the big moguls lobby for the extension of intellectual property laws. Proprietary software is an exercise in power politics because the IP laws grant firms power and control over the programmers and the users, and only a “few make the basic software decisions for everyone” (Stallman & Kuhn 2001). A possible alternative to this exploitation of authors might be through the principles of attribution and share-alike, meaning “that while creative work may always be copied, modified and synthesised into new works, previous creative work is valued and recognised by the community for its contribution to creativity as a whole” (Berry 2005, p.4)². Furthermore the FLOSS movement could regain control over projects through the use of componentisation which “is the process of atomising (breaking down) resources into separate reusable packages that can be easily recombined” (Walsh 2008). More and more technology shapes our social lives, therefore the discussion around the constitutive nature of technology becomes an issue. “Introducing democratic accountability to code may well be the democratic challenge of the twenty-first century and steering the implementation of technological artefacts will increasingly contribute to our ability to keep our future open and democratic” (Berry 2004)³.

This could signify a *Culture Without Commodities* (Stalder 2002). To a certain degree this is already being practised within the fields of music and software programming and some forms of cultural production (such as avant-garde, underground, DIY-movements, parts of academia and Open Source movements) that are not selling objects. The motivation of those groups is not the commerce, but the recognition, often by limited numbers of people, that the exchange between peers is the vital part of a culture without commodities. FLOSS culture, which extends into net culture, is more than about what happens between people and networks. In *Free Software as Collaborative Text* Florian Cramer argues that FLOSS is a “rare example of electronic literature which does not confuse the Internet with web browsers” (2000)⁴. As FLOSS is a non-rival, non-excludable good it cannot be sustained according to conventional market logic. Paradoxically it is being sustained, exceeding often “the capabilities of conventional proprietary, binary-only software” (J. Boyle 2003, p.44)⁵. But for Chris Atton it “seems that the dominant regimes of copyright and intellectual property relations are unlikely to be replaced by a new model based on social authorship. At best, these practices of file sharing on the Internet appear as marginal interventions that can do little more than chip away at the enduring and limiting logic of capital” (2004, p.110). In that sense we might soon be witnessing a disappearance of public spaces in cyberspace, as happened with urban public spaces. Urban public spaces were planned in the form of parks, squares, and promenades. These spaces served for people to meet, communicate, exchange ideas, and expose themselves to diversity. But today urban public spaces frequently do not support this freedom any more because often they are privately owned places, like shopping malls, which can prohibit any action that hinders the consumption of commodities, such as demonstrations.

Remember that a 'boulevard' was originally a walk planted with trees which circled the town and usually occupied the space where the old ramparts had been. (Perec 1974)

On the other hand, digital networks provide new possibilities for participatory media practices, especially through the use of Free Software. Since art and ideas never develop within an art-historical vacuum but always feed on the past, Free Culture promises to make our cultural heritage accessible to everybody to re-read, re-use and re-mix as they like, “without open access to the achievements of the past there would be no culture at all” (Medosch 2003)². Participatory culture often ignores or violates copyright restrictions that might apply to media artefacts or software employed; this form of 'piracy' and sharing can be perceived as a cultural statement.

*But one ought have a critical stance towards the notion of the 'free', because 'free' is included within the economic system and, as such, file-sharing is part of the economy. Free production, as well as sharing, should be an option, allowing for experimentation, and “producing culture with other economic models, on a global scale” (Lovink & Rossiter 2006). An example is the academic AAAARG file-sharing network: an effective distribution system in terms of its scalability, openness and durability – only made possible, however, as a conglomerate of both human and non-human agency. In fact, file-sharing can not only be used for distribution, but for actual collaboration and production. In that sense a legal system, social contracts, aiming to control the data spheres, needs to be tailored carefully because “sharing” a file is not equal to “sharing” in the physical world, it is rather facilitating the copying of that file (Logie 2006, p.85). In his research on file-sharing, Jonas Andersson refers to the situation as being controlled by the most driven producers and consumers, and further states that the old distribution model is so impoverished that it chooses the safest route, “the most bland of bets” (2009b). Boyle warns in *Guerilla Television Revisited* (1997) of the pitfalls of participatory media. For Boyle historically such cultural statements, coming from media and arts collectives and their participatory media practices, have often been absorbed and used by mainstream media, paradoxically the very institutions these collectives resisted and tried to change.*

I further argue that the windows of opportunity emergent digital networks are currently offering might be short lived, especially the potential of decentralised distribution technologies such as file-sharing. Due to current changes in legislation we see the first examples of digital networks being formatted and regulated, for example the blocking, and many argue the censorship, of websites offering access to decentralised distribution technologies. FLOSS culture therefore might allow for a new legislation, as well as alternative licensing schemes and open contracts offering participatory media producers a possible legal framework. Thus applying the notion of 'social contracts,' the notion of open and distributed sharing can be reinforced as an overall heuristic and social ethos.

Seen in the light of media moralities media production for the welfare of others challenges the ideological belief in the 'individual' having to succeed. When sharing code (Himanen 2001), media, art and culture in general, it is ultimately a challenge to one's own ego, and it is also a subversion of selfishness. Arguably our drive to own property, or in the context of FLOSSTV 'intellectual' property, makes us underestimate the difficulty of engendering a greater compassion in ourselves for those we live with and share our lives with— basically the society we are part of:

The purpose of property is to ensure a propertyless class exists to produce the wealth enjoyed by a propertied class. Property is no friend of labour. This is not to say that individual workers cannot become property owners, but rather that to do so means to escape their class. Individual success stories do not change the general case. As Gerald Cohen quipped, 'I want to rise with my class, not above my class!'. (Kleiner 2007)

Everything we consider we own is always dependent on others. Any intellectual property (and indeed all cultural production) is based on others' efforts, dependent on others' labor, dependent on audiences supporting one's own production. Intellectual property becomes interdependent. If we accept that the welfare of others is as or even more important than our own welfare, if we accept that we all have equal rights, we can decide that intellectual property is unjust, or, to paraphrase Pierre-Joseph Proudhon (1840), that *intellectual* property is theft.

Without becoming aware of and challenging one's own greed and selfishness there is no progress towards 'social' media. The novelist Norman Mailer stated that "the only way socialism can work is if there is ... some larger sense of things. [Otherwise] you just get the play of egos" (Quoted in Bellos 1997). My view is that any FLOSS practice needs to analyse its motivation in order to overcome ignorance of greed, and that "it is not enough to address ignorance with political argument, because anger and greed are an active form of ignorance - they repel counter-arguments. If we are to open minds, we must also open hearts" (Edwards & Cromwell 2009, p.251). Engaging with FLOSS practices then becomes a virtuous action, an ethical practice. A *spiritual master*, Śāntideva, once wrote in the 8th century: "All those who are unhappy in the world are so as a result of their desire for their own happiness. All those who are happy in the world are so as a result of their desire for the happiness of others. ... Note the difference between the fool who seeks his own benefit and the sage who works for the benefit of others" (1997).

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ARCHIPELAGOS OF ART

PETER HAGERTY

The paper considers the rapidly growing metaverse and its implications for a post industrial society with particular reference to the new art forms specific to this new medium.

Today the internet is the backbone of the global economy and without it our industrial infrastructure would collapse within hours, but a decade ago people would ask “Why do I need a website?” Today nobody asks that question, they may prefer a Blog or Facebook page but whatever format they choose an online presence is a recognised door which connects to other people. Today the contemporary question is “Why do I need a virtual world?”

During the period the web came to dominate the media landscape there was also a parallel development of virtual environments, commonly seen in the ubiquitous games for the Sony Playstation or Microsoft's X-Box. For most children in the western world these games have come to dominate their leisure time, gone are the toy soldiers and masquerade of 'cowboys and indians' the arena is now a virtual theatre of war where every kill is a point.

There is however a lesser known type of virtual environment which is distinguished from the aforementioned games- which are characterised by agreed movements, a defined outcome and usually in terms of one player or team winning. In contrast these other virtual environments are self authored and initially present an empty world, a *tabula rasa* where an author can create whatever he or she wants and if rules are to be used that is the authors choice.

The example of Second Life (Linden Lab 2005)[1] provides a good introduction to the possibilities of self authored virtual worlds and there are now many similar examples in the rapidly growing worlds of Open Simulator [2] where the term metaverse is used to describe a collection of virtual worlds - rather like continents which are connected to each other with the ultimate goal of creating an internet scale virtual environment network.

The word which most characterises the virtual environment is immersion, virtual environments are immersive environments. When we read a novel we immerse ourselves in the story and empathise with the struggles of the heroine or anti-hero and the dramatic arc of their lives on the page. For the duration we allow ourselves a willing suspension of disbelief in that while we know the events in the story are not real we allow ourselves to believe they are. The same pertains to cinema, particularly in the genres of the thriller and horror, these are ancient pleasures which earlier generations had similarly sought in theatre, opera and epic poetry.

Imagine then that instead of sitting in a comfortable chair, fingers tense with fear, watching and empathising with the on-screen character – that instead you are the character! This experience is already familiar to children in their war gaming where the psychological response to such immersion, the feeling of actually being there is very intense.

The rapid growth of virtual environments has prompted psychologists to ask why? What is the attraction? The evidence from surveys is complex, [3] but anecdotes suggest, for the game players at least

that a common reason is “Because real life sucks”, a sad finding perhaps but most of us would recognise some truth to this and further we would not be surprised that a university educated supermarket shelf stacker would, rather than stacking shelves, be a knight on horse back with his damsel avatar by his side leading fellow warriors into battle to defeat a deadly enemy? Oh but that is only fantasy you say, he is dreaming and indeed he is. But isn't escapism the *sine qua non* of the novel and cinema? Recollect the rebuke at the end of the nineteenth century when people remarked of a friend “Oh she is clearly not well, she spends all day at home reading French novels.”

Escaping into virtual worlds offer an escape for those who find the real world insufficient to their needs and while living a surrogate life as a medieval knight might not be your choice, a more disturbing ontological question is “If you could live in a world that was just the way you wanted it to be, with specifications you'd chosen, customized and personalized to meet your every need and fulfil your fondest desires, would you spend all your time there? Or would you prefer to stay here, in the real world?” [4]

Fundamental to this enterprise is that the avatar is an abstraction of its owner and frequently a person's avatar is an idealised visual representation of them self, a remodelling based on vanity but also, with the potential for some, to bring a beneficial change in how they can socially interact.

We discriminate on the basis of sex, race, colour, we judge people on their looks, their able bodied-ness and their age. If the base causes for our prejudice could be removed, to create a more level social playing field, would this correspond to an improvement in social well being?

In a virtual world the avatar of an isolated house bound eighty year old person could look like a thirty year old who could – in world, talk and interact as an equal again. A hospital bound patient, a paraplegic, the extremely shy, those without the power of speech anybody who can use a mouse can find in a virtual world a new place for social interaction. Let us be clear, this is not an either or situation; nobody lies in bed reading French novels all the time.

War gaming is the first and seminal example of online role playing, less complex than Aeschylus' reworking of Herodotus it is also the simplest because players don't need a 'character', they merely require to know their allowable moves and how to take an opponent out of the game. But if the motivations are not as simple as kill or be killed how is dramatic structure established? Actors in theatre and film are aided by a script describing the actions, plot and characters, in role play these crucial narrative devices, excepting the character, are not available. This is the realm of the highly literate paragraph role players where a loose plot is perhaps agreed in advance but all the dialogue is written on the fly.

Clearly the 'killer app' of virtual worlds is interactions with other people and while the potential for duplicity is a given we also know that we are in the realm of theatre. As Vernant remarked “In the case of Dionysus, the mask disguises him as much as it proclaims his identity.” [5] The avatar is our mask and like the mask in the Baccic rituals and the festivals of Carnival it offers a temporary release from the mundane. The mask offers liberation, a device for fiction which explains why role play of a sexual nature is common allowing individuals to explore psychological danger from a safe distance.

Other aspects of virtual worlds offer new opportunities for visual artists particularly photography, animation, machinima and virtual sculpture. The virtual camera presents an entirely new tool for a new subject, the *mise en scène* of virtuality. In parallel with still photography there has been the rapid growth

of machinima, the use of real-time 3D computer graphics rendering engines to create animated cinematic productions which will in the coming years transform advertising, promotional video and cinema.

There is another genre of art which is unique to virtual worlds, an art of such originality that it rarely reaches the museum visitor. Part of its description would be virtual sculpture, abstract compositions of prims, textures, particles, transparency, phantoms and physics where space itself is a plastic dimension. One struggles for a language to describe these conceptual and immaterial works in which an amalgam of technical finesse and aesthetic sensibility combine to demonstrate a pure digital craft.

Many virtual world artists use scripted code for contributory effect in abstract works to describe possibilities, others embrace the language of virtuality with formal composition and audio while others use virtual art to reflect upon the real world. Social, dramatic, aesthetic and conceptual the virtual worlds are ground breaking, the avant garde is alive and well and living on the archipelagos.

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THAT STRANGE FEELING

IAN HAIG

The uncanny as defined by Freud is that which is uncomfortably strange finds a special kind of resonance with various kinds of technological media. This paper discusses how different kinds of technologies can evoke the uncanny, while tracing the emergence of electricity as a kind of uncanny phenomena to more contemporary instances of the technological uncanny in the work of various artists and other assorted pop cultural references.

Technology has long had the ability to evoke and bring to life notions of the uncanny, the history of electricity itself has been associated with the territory of the inanimate and animate in a variety of ways. A catalyst for a state between that which is living but should be dead, the familiar made unfamiliar, together with providing aesthetic feelings of dread, horror and given to feelings of distress.

Perhaps one of the most striking and memorable experiences of the uncanny and electricity occurred on a personal level on visiting an exhibition with my at the time one year old daughter featuring the work of artist Tony Oursler. On entering the darkened room of the gallery and upon seeing one of Oursler's familiar 'electronic effigies' of projected video onto a small mannequin, all was calm as both myself and my young daughter contemplated Oursler's piece. However once the video started to move and talk, my daughter let out a blood curdling scream of sheer and all consuming terror, which I haven't witnessed since. Clearly she was disturbed by what she believed to be an inanimate object, ie: a doll, suddenly come to life, however the uncanny effect was more so seeing her react in such an extreme and distressing way.

The experience on viewing the Oursler piece with my child, became doubly uncanny, his work was already playing with notions of uncanniness, of the inanimate made animate through the ethereal and ghostly effects of video projection onto anthropomorphized dolls. The intense emotional reaction my daughter had on viewing Oursler's piece was as if she herself were possessed. Such an episode recalls Freud's notion of epileptic seizures and of madness having their origin in the uncanny, of the body being momentarily taken over or possessed, indeed the middle ages saw such behaviors as ascribed to demonic influences. [1] Like the prisoner on death row, their body on the receiving end of 2500 volts, the epileptic seizure is uncanny in its appearance, in recalling the violet surge of the body electrocuted, electricity not as the spark of life, but death. The epileptic fit a kind of uncanny living death, that one recovers from. As the body slips over into another state of being, the nerve cells that transmit electrical impulses of the brain, momentarily disrupted.

For Freud the doll holds a special place in the corridors of the uncanny, in particular when dolls appear alive. [2] Freud has outlined children live in an animistic world, where the line drawn between living things and lifeless toys is a blurry one. Children engage with their dolls as if they were alive, while adults are often unsettled by things that oscillate between life and death, as the doll, or mannequin momentarily appears as a living entity, activating our uncanny senses.

1890 saw the release of one very strange and uncanny doll indeed, known as Edison's talking doll. The doll featured a miniature phonograph embedded inside. These "talking" baby dolls were possibly the

first attempt at using sound technology in toys. As Gaby Wood has pointed out, the capturing and reproduction of speech in the early phonograph was integrally linked to finding a casing for it in human form. [3]

Edison's talking doll however was a disaster for the inventor, production delays and poor recording technology and damages to the toys when they were distributed. Combined with a recording of a voice that sounded entirely strange and otherworldly, which did more to creep children out. Edison would later refer to the dolls as his "little monsters".

Erik Davis too has pointed out today's realistic "Real Baby" dolls are a weird mix of servo motors, electronics, and that imaginative zone of the uncanny. [4] Programmed to simulate real infants, The Real baby doll, can poop its pants and fart, as basic bodily functions take on a strange, electronically mediated life for their attentive real life baby mothers.

Mark Dery sees "The Home Shopping Network's Gallery of Dolls as a televised infomercial for Freud's uncanny", featuring an array of disturbing, lifelike collectible porcelain dolls. Their transfixing gazes frozen for all time in a "queasy mix of sentimentality and side show grotesquery" [5] glaring at us through televisions unflinching electronic stare.

From televised transmissions of the uncanny doll and uncanny sound technology to the uncanny phenomena of electricity itself. In 18th century England electricity was an ongoing preoccupation with many. Benjamin Franklin the American politician and inventor, presented a paper in 1751 at the Royal Society putting forward the idea that lightning was an electrical force. As the new world was being discovered, so too was the discovery of various new and exotic animals, one of which was shipped to London in 1774: The electric eel. Combining the absorbing preoccupation of the uncanny wonder of electricity together with the strange, and almost otherworldly new species which could emit an electric charge. The electrical eel also saw the bizarre and popular craze in London of 1775 of electric eel parties, which saw gatherings to see how many people could feel the electrical eel charge, as people joined hands shocks would be felt by all. [6]

The technological uncanny too finds its home in medical equipment, devices for keeping the body from slipping over into death. The medical machine infused with a high degree of uncanniness and certainly downright creepiness as Bruce Grenville has pointed out is the iron lung. [7] The machine embrace of the iron lung, once the only way to assist individuals whose chest muscles has become progressively damaged by polio. The Iron lung has many connections to the uncanny, the undead body being kept alive by the assistance of a machine designed to expand and contract the chest. Not to mention the associations of the machine and its relationship to the unsettling fear of a horrific and devastating infectious disease, as if somehow the iron lung embodied the disease of polio within itself. However perhaps it is the notion of the iron lung as a kind of perverse cyborgian architecture, the notion of the body being controlled by a force outside of itself.

Andy Warhol's Big Electric Chair from 1967, also understands the idea of a technology that can embody an unsettling quality and provides us with an aesthetic quality that arouses a feeling of absolute dread. Warhol's iconic image revealed that aspect of the uncanny, where something is seen which is normally hidden from view: Death by electrocution, planting the seed of the electric chair in the popular consciousness as a technological object imbued with a devastating fear.

Electricity can create life, as easily as it can destroy it, capable of transforming the inanimate into the animate and back again. For some time too it was believed it could also heal the sick and the diseased. Electrotherapy has a long history in early 20th century medical practices, in particular the galvanic bath, of soaking in electricity infused bath water for a cure all. To electro shock therapy, now renamed as Electroconvulsive therapy, a psychiatric treatment in which seizures are electrically induced into the patients brain. Early electro shock therapy often resulted in extreme side effects, of seizures, and turning patients into a vegative state, as consciousness slipped over into that uncanny space between being alive and dead.

It is the Alternative Health fraternity that have carried the torch for electrotherapy in recent years. Which puts forward the belief that the human body is composed of negative and positive electrical energy, indeed all living matter carries with it an electrical charge. The appearance of the electrical zapper, for the user to wear, which literally zaps the users body with an electrical current to rid the body's internal organs of pathogens and disease, renders the body as an uncanny conduit for electrical impulses.

I sing the body electric and electricity as that life-force which one takes for granted, as a bringer of death, life, re-animation and health and perhaps most of all as an activator of that mysterious terrain of the imagination known as the uncanny.

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SEAMLESSNESS IN THE ANALOGUE AND DIGITAL

Sigune Hamann

Sigune Hamann will discuss work on representation of movement, time and narrative structure through image manipulation with a focus on her process of capturing and reading the dynamics of urban environments in panoramic film-strips.

Introduction

As consumers and producers of contemporary visual culture, we are in an era of high-resolution photographic realism. Continuous hardware and software development simulate close up sharpness in images and hyper-real movement through zoom and panning-actions and enhanced playback technology. In counterpoint to this, I develop analogue film-strip imagery using a still camera in the manner of a movie camera that offers a different representation and a deconstruction of the way we see rather than the objects to be seen.

Reflecting on ideas of data disinformation, this paper will look at the representation of movement, time and narrative structure in film-strips, and examine shifts of information and overlapping, repetition and blurring of images as part of the analogue and digital process of production. It will reflect on ideas of seamlessness and continuity at a time dominated by fragmentation and layering.

Film-strips

PHOTOGRAPHY

In photographic film-strips I capture the energy of urban environments and the movement of people. This process of 'tracing' in film-strips involves using an analogue photographic camera like a movie camera. A whole roll of 35mm film is exposed in a continuous rewinding movement while I am also moving in relation to the subject. The celluloid moves past the lens in a cinematic movement, although unlike film exposed in a cine camera, time is not separated frame by frame but flows in a continuous exposure over minutes to produce one long panoramic image. Although the images are static, they contain the indexical traces of movement – of the film, the camera and myself moving within the optical field.

The hand held camera as an extension of my body and the performative process allow for elements of chance within the work. I intuitively respond to each situation, varying the speed of my own movement and of rewinding the film. Moving elements such as people register more clearly than static backgrounds, which dissolve into ambiguity. The movement of the camera parallel to the movement of the objects let them appear in repetition.

The speed of the rewind is un-even. Moments of slowing reveal the analogue photographic process; vertical lines due to momentary framing become visible. Accelerating the turning results in extensive movement blur. However the level of layering, abstraction and focus cannot be planned, only performed.

INSTALLATION

Digital technology allows the film to be scanned and seamlessly printed in large segments. Viewers can re-enact the time sequences chronologically in video animations or by moving along the images of large-scale photographs, from segments to 360-degree installations relating to the situation in which they were taken. Like fleeting mental images they are at the same time linked and freed from the event, the environment and action that they record.

The film-strip showing at this year's ISEA exhibition *Uncontainable: Broken Stillness* is a segment of a photograph taken in Whitehall in London last year, during a protest march against the increased student tuition fees. As a demonstrator at the march I captured the dynamics of students and fellow staff moving through Whitehall, chanting and waving banners and flags in a unified expression of protest. For the duration of the exposure the film is rewound past the lens in the hand-held camera, following the movement of the crowd. This process abstracts and compresses the action revealing both chaos and order, yet details are enough to fix the image as an indexical record of the actual event.

The imagery captures the moment described by Götz Großklaus referring to Elias Canetti, when multi directional movement becomes homogenous and when a common goal directs crowds in a common movement, physical and psychological — the moment when we are no longer in a crowd of strangers but in a crowd of 'equals': The movement of the crowd appears in short time stops and starts, in stagnation and continuation. [1] These rhythms and the compression and expansion in transit find their correspondence in the mechanical process of rewinding the film, hesitating and accelerating, and by the fluid density of the resulting imagery.

SEEING AND READING IMAGES

Film-strips are a result of a direct, perhaps pre-cognitive form of seeing and an experience of the duration of time, produced through mechanical and chemical processing. The images are referential and real with a clear pictorial definition within them while showing a general degree of motion blur.

An absence of language is suggested, while objects are present that refer to something apparently quite concrete. As conventional ways of seeing and reading images become less applicable, the representation of visual information in the film-strips becomes closer to the physiological process of seeing than the information itself.

We have learned to see and to understand visual data, to make sense of images in a subconscious process. It is part of an evolutionary development, processing visual input to concentrate on what's vital to us and builds images in our minds. The brain constructs images and seeks order to establish correlations, consistency and continuity. Images change with rapid technical developments, and our perception tries to adjust correspondingly. I think however that the discrepancy between reading an image as a form as it used to be and now experiencing it as an event, fragmented, layered and changing over time needs to be addressed, and that the change of conventions of processing this information is not quite as fluid as it might seem.

The construction of movement and seamless images in the brain depends on our sense of space. According to Wolf Singer the clarity of inner spatial images stems from an evolutionary development, defining the long-term memory mainly as a memory of places and their relationships. [2]

Conclusion

TIME AND CONTINUITY

The length of time represented in the film-strips is determined by its physical length. In terms of mathematical, continuously moving time a couple of minutes of an event are captured. Film-strips don't have beginnings and ends in terms of narrative; they are segments of an ongoing experienced time, the long format suggesting continuity before and after. These segments become like fragmented memories that represent situations or narratives within them.

Film-strips represent a unique sequence of time, but there is a sense of eternity also through repetition of movement, one film-strip written in panning movement over another, images and activities being replaced by others continuing an ongoing narrative. "In life we are accidental witnesses of certain events and images, whose duration in time we cannot control. That's why all art begins with the wish to fix a moment, and to make it last for a long or even infinite time. Only then will the viewers have endless time, that they need to determine duration and rhythm of their observation autonomously." [3] Time is embedded in the film-strips in a curious way relating equally to sequential moving images, sequential still images and single photographs. Although time is stopped, a moment is extended. As Andy Warhol described it in connection with his 8-hour projection *Empire* one can "see time go by."

The film-strips are loops, particularly in panning animations or 360 degree installations. Loops create new meaning through fragmentation and seamless repetition of original data. As with patterns or a motif in music, the brain registers repeated elements. Loops are generators of form; they offer the possibility of infinite extension, continuity and the evasion of an ending.

"The art of today seems to have discovered a new endlessness. However we are not dealing with a renewal of a romantic aesthetic of the sublime, but the endlessness of the continuation of the always similar in small variations, the endlessness of a project of Continued-Life, that cannot be completed, but only left behind." [4]

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BIOCYBRID ECOLOGY: ART, TECHNOSCIENCE AND LIVING SYSTEMS

CAMILA HAMDAN

The article is about two transdisciplinary art projects, developed in Brazil. These works were made by the augmented reality technology. In the first, the body tattooed with AR code, in performance art was connected in network for modelling winds. The second, an object modelling - 14BIS-, Santos Dumont's aeroplane was in the sky. These artistic works describe the reinvention of the environment by physical space and cyber data.

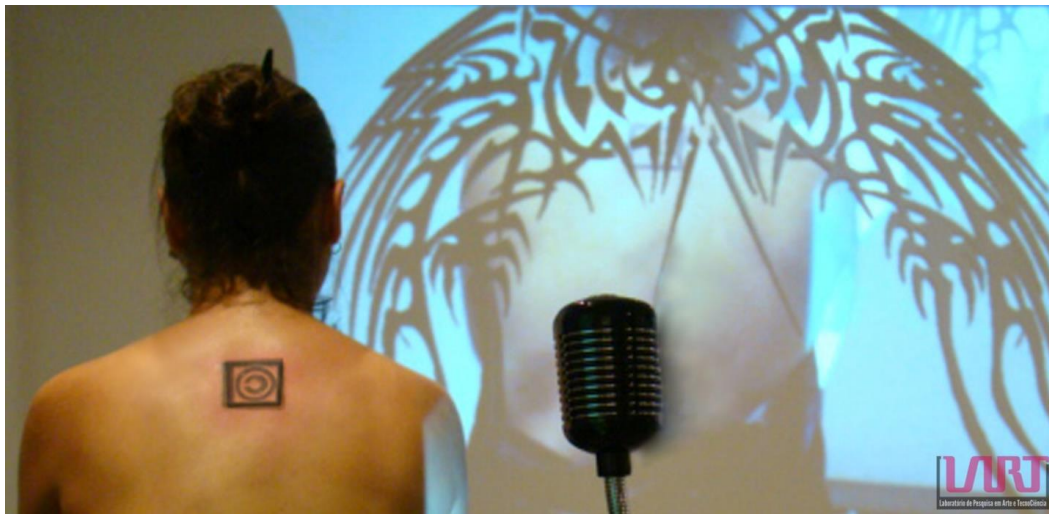


Image 1. Opened Body Connection. Computer vision system and projection of the wing actually increased from the tattoo.



Image 2: Opened Body Connection. Cyberperformance held at the Museum of Image and Sound/MIS during the IV International Festival of Mobile Creativity - Mobilefest on November 14, 2009, in São Paulo-SP, Brazil.

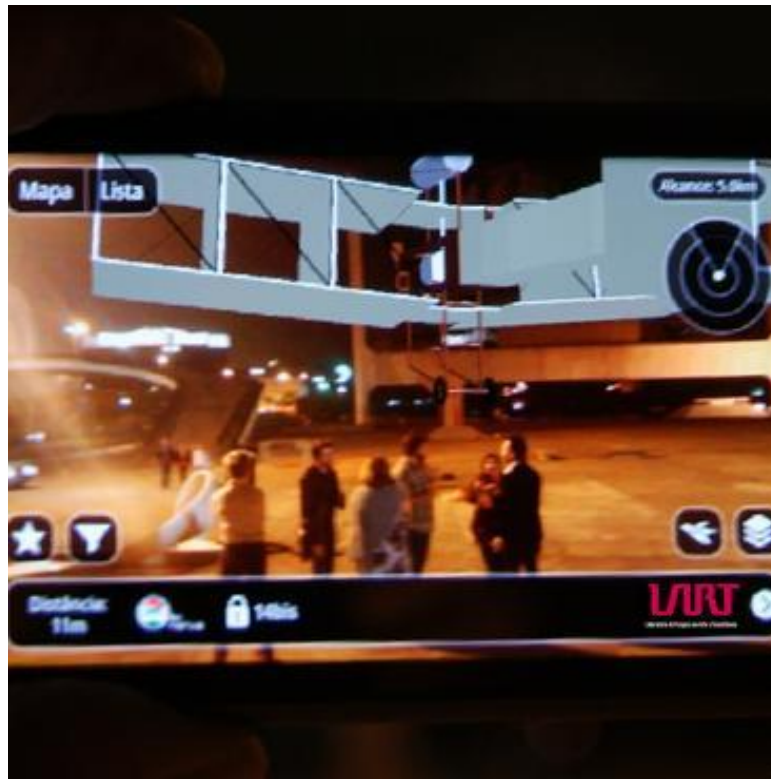


Image 3: 14 Bis airplane. Latin America Memorial, São Paulo, Brazil. September 2010.

Our goal in this paper is to describe the theoretical-practical context of our current production, developed in Brazil, in the Laboratory of Research in Art and Technoscience, that from a transdisciplinary approach offers us a new vision of nature and reality integrating concepts of Philosophy, Biology, Physics, Art, Computing and Engineering, as systemic parts of knowledge, in which 'all disciplines investigate the same issues, all sciences become a single science.' [2]

Thus, we find in Art and Technoscience a way that allows us to contribute with the reflections about the contemporary human being in the environment in which he/she lives. The challenge of relating art and software engineering, automotive, electronics and biomedical research at the Faculty of Gama, Brazil, is unprecedented in Latin America. To guarantee this, we rely on national agencies to foster scientific and technology research that enable the formation of human resources for research in the country. The partnership between the Government, companies and universities in which it begins, allows us to generate new ideas and suggestions that can contribute to our common goal of expanding knowledge of human possibilities.

The current scientific world has unveiled a new condition of life on the planet. We are increasingly concerned with the nature and the human being, thus, innovative possibilities of artistic creation emerge.

Studies that approach art, biology and technology research of artists and precursor scientists of the body dialogue as support, manipulation, speech, expression, and biological view and that overturned or challenged the physical, emotional and sensitivity limits of the human being concurrently with technologic developments of his/her time, have been of great importance for our research.

Assumptions of body art: visible and invisible imagination

The body in motion as a proposal to challenge the physical limits of the human being can be seen in the 'Manifest of Futurism' by Fillippo Marinetti (1909), which explores the notion of speed and strength in sculpture at the beginning of the twentieth century. The body that is represented there, crawls, fighting against an 'invisible' force which introduces the concept of time as the fourth dimension represented in a sculpture. The 'invisible' forces grounded in technological developments of this time, for example, the work *Unique Forms of Continuity in Space* (1913) by Umberto Boccioni, suggests the viewing and the tactility of informational data from an unseen force, where perception is not only in the hand, but on the whole body/mind complex that it touches.

Gestural actions are also noted in Pollock's *Action Painting* (1947), in which the visceral motion of his action, allowed to record information of the violence of his muscular body gestures through the paint on panels. Abstract art emerges then, as a painting from hand signals of the body as expressive means.

The paintings and conceptual objects of the 60s start the dialogue of the moving body, which soon become ephemeral artistic actions experienced in performances, *happenings* as social and conceptual criticism that relate the aesthetic art of the event and the human condition of the time. Yves Klein's (1960) female bodies as 'living brushes' contribute to the visual record of biological images, in a process of stamping anthropometry.

The principle of using the body as support and artistic expression also comes from the conceptual physiology of the *Body Art* (1960) movement, in which performing creations are developed with public participation, in places related to the concept of the presentation. Artists experience bodily limits of sensitivity and affection: pain, pleasure, discomfort, intimacy and happiness in intuitive, cognitive, basic and complex emotions in the performing actions.

Thus, the set of logical operations of the possibilities of human actions are considered as natural languages used in the analog art (op art and kinetic art, Fluxus, *happening*) with the intuitive use of the concept of algorithm (instructions to perform a certain task) leading to an explicit integration with the public. [10]

In parallel with the artistic manifestations, technological advances in programming languages, artificial languages or digital codes created sequences of signs in the form of letters of intuitive instructions from control systems, instruction and game rules. [10] It was with the mathematical, logical and cryptanalyst Alan Turing, in 1937, that the concept of algorithm and the area of Computer Science were created, by the *Turing Machine* through the computing devices designed to help investigate the extent and limits of what can be computed.

There are many trials and artistic provocations that test the limits of the human body and assign in experiential character, in performing and objectual actions, the visible and invisible imaginary, involving questions about life itself.

Today, seven decades after Alan Turing and much artistic experimentation, proposals for computing the sensitivity and affectivity of information through human body emerge. In this sense, we consider the concept of 'biocybrid ecology' we have proposed as a perspective of a systemic view of interaction, perception and cognition through practice and theory of techno-artistic that allows reengineering life.

Reframing of consciousness attained in the post-biological era, lived in the 'Cybrid Architecture.' [1] proposed by Peter Anders, where the properties of the informational data of the cyberspace are entered into the physical world we know, in which a new quality emerges, the cybrid, composed of contents added to the hybrid world of cyber data.

These are systems that allow a co-existence in a continuum between the virtual and physical reality endowed by an interface for vision and interaction. They hybridize the physical and digital spaces, simultaneously, overlapping them in a hybrid that becomes cybrid. [5]

In this sense, the important technological change, proposed by Mark Weiser, [9] is the one that fundamentally changes our lives from the place of technology. In this way, what really matters is not the technology itself, but its relationship with us. According to the author, in the last fifty years there has been in computing major investments in research on the relation of bodies with the technologies.

Today the Internet is taking us through an era of widespread distributed computing for the relationship of ubiquitous computing. It is the relationships and interrelationships of technology in our lives, in the environment and in our bodies, when shared between each one of us and the things of the world, everywhere, that ubiquitous computing has aimed to make the use of computers emotionally invisible to the user, making it available throughout the physical environment, subtly, characterized by the spread of properties that make the cybrid emerges.

The bonding of synthetic data to the real world creates scenarios by inserting the virtual to the real. This is the mixed urban life or mixed reality whose actions mix spaces that aggregate and paste information to specific locations. Mobile and locative technologies are used, pasting data on the reality to be viewed through devices such as webcams and/or cellphone cameras.

In this sense, we are going to describe the work *Opened Body Connection* as an artwork that uses the technology of augmented reality (AR), approximates the human body of the desire for ubiquitous technologies and contributes to new perceptions of reality, for the production, awareness and interaction of natural and artificial feelings as an integrated whole of the body in interaction with the environment.

For two hours, three-dimensional animations ranged the body being tattooed in a ritualistic moment experienced in the interstitial space between flesh and the cyber of data. On the back, the figure of the tattooed copyleft, as a marker of augmented reality that allows the machine to enter on it three-dimensional animated wings. In this sense, the marker makes a pun on the concept of copywriter, which is commonly used in reference to copyright, the intellectual works and their authors. Thus, copy-

left opens a new thinking that enables the copyright as a way to subvert the rules of copyright protection and remove barriers to the use, distribution and modification, in this case, of a creative work, demanding the same freedoms to be preserved in modified versions.

Opened Body Connection is an artistic proposal that alludes to the body without authorship, copyright, collective and artistic production with the use of free software and open source for the continued process. In this sense, the body is not unique, but open, built by multiple senses of the connection. They are cyber data flowing through it and beyond it in direct contact, invisible, tangible by the network sensations. A freedom to bend boundaries that transforms the organic into a cyborg body. Skin with a data cloud that are seen and experienced by the sharing of information. A cyber performance configured in the relationship between humans and the environment, a mixture of information, transmitted in real time by the Internet through streaming of sounds, images and texts in an interaction channel composed of social networks.

Another artwork that uses augmented mobile reality and geo tagness for mixed landscapes is *The 14 Bis Air Plane*. Expanded interactions and mixed landscape generated the *14 Bis* cybrid system, to celebrate Brasilia's 50th birthday, in a public event that explored mobile and locative interface in mixed reality. LART creative practice put in the Brazilian capital's sky the historical plane *14 Bis*, invented by the pioneer of aerospace engineering, Santos Dumont. The virtual plane in real scale (with a length of 15 meters) is geolocated in augmented reality, with the tag code placed in the satellite exploring the Global Positioning System and results into the data visualization apparition of the historical plane flying in the city sky.

Perception and cognition in the new human condition

Thus, the phenomenon of behavior and perception is, according to Merleau-Ponty, the first contact with the world that takes as its starting point the existential facticity, human phenomenal, doing a transformation of subjectivity, making the body the subject of perception. Similarly, ubiquitous computing presents a new approach to appropriate technology for our lives, called 'calm technology' [9] involving the center and periphery of human attention.

It is in the periphery that things are tuned by a large portion of our brain devoted to processing sensory peripheral to the notion of ecological perceptual possibilities [4] applied to the psychology of things. [7] It is the mixed environments that people are surrounded by intuitive interfaces embedded in everyday objects and around them.

The perception, according to Alva Noe [6], is not something that happens to us or in us, it is something we do. Consciousness of perception depends on the capacity of action in a physiological process of brain thinking, on the ability of the body as a whole. To perceive, according to this enactive approach of perception, is not only to have feelings, but it is to have the sensations that we understand. According to the author, the content of perception is not like the content of an image; the world is not given to consciousness at once, but it is gradually acquired through active perceptive exploration of the knowledge of the body.

According to the biologists Humberto Maturana and Francisco Varela, enaction is guided by the understanding of perception through the actions of the subject in space. 'To the extent that these local situa-

tions are constantly changing due to the activity of the individual perceiver, the necessary point of reference for understanding the perception is no longer a world previously given, regardless of the subject of perception, but the sensory-motor structure of the subject.' [8]

Cognition, in its structures, emerges from the sensory-motor experienced schemas that allow the action to be built and guided by perception. It is the experiential sensorimotor contextualized structure, 'the way the subject perceiver is written in a body, [...] determines how the subject can act and be modulated by the events of the environment.' [8]

By taking a creative capacity of operational intervention upon life on manipulations of its conception and procreation, the human being participates actively, in the perspective of evolution, of a process which could alter its nature.

The construction of techniques and production of tools have always followed the human phenomenon. The formation of man – anthropogenesis – coincides symbiotically with the technogenesis that the first tool of man was his own body. In this context, nature reflects the interdependence between anthropogenesis and technogenesis in an ecological way in a new human condition.

Oliver Dyens [3] examines the convergence of computing, communication and biotechnology into a new paradigm of information as a very important thing of what is happening with the 'human condition', that was thought to be essentially unchanged.

Physiology of the Emotions in biocybrid feel

Physiological data, image processing in expert systems are the basis of Biomedical Engineering, thus, a new concept of biocybrid emerges [2], reaffirming the body/environment biology in the cultural scene of existence in Cyberculture, in sensorimotor experiences in ubiquitous computing, differs from the connections and evasions of virtual environments for the mixed bioconnected spaces.

For these reflections, the James-Lange theories (the actions perceive the emotions and the brain interprets them), Cannon-Bard (emotion is felt first and then follows the cognitive actions, the thalamus and amygdala plays a central role, interpreting an emotional situation and, simultaneously, triggering the sending of signals to the Autonomic Nervous System and to the cerebral cortex, which interprets the situation cognitively) and Shachter-Singer (contributes with differences in emotion and self-perception), are extremely important for the 'Physiology of Emotions' in the aspect of a Biocybrid Ecology, of an emotion in a dynamic state of physical events, cognitive, and cyber data with the use of ECG, EMG, Galvanic Skin Resistance – GSR and NTC thermistor for creative, artistic purposes in human edges for expansion interfaces and perceptual and affective supplementation.

Environments and smart objects, augmented reality, ubiquitous computing, pervasive and tangible, make it possible to understand the body experiences in human-computer interaction, of emotions, cognition and perception through the body, physiology and behavior.

We give voice to human free will, by monitoring and detection of biological motion signals produced as a result of conscious choice or not, measured by technology. For this interaction, the LART Research Group adds the research of physicians, therapists, computer programmers and engineers with the

aim of detecting emotional expression, turning it into sounds and images projected on the environment, in a process called Data Visualization in which we contribute to the propose of the New Abstraction construction.

Featuring biosensors, one can detect tension and intentional movements of any person during an action, in a daily performance from or even in rituals that transcend one's own body, as part of a complex ecology of the cosmos.

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PERFORMING STRUCTURE: FINE ART AS A PROTOTYPE FOR PARTICIPATION

Karin Hansson, Love Ekenberg, Johanna Gustafsson Fürst & Thomas Liljenberg

The art project *Performing Structure* (www.performingstructure.se) deals with the performance of organizational systems like democracy in a place structured by globalization. An art exhibition in the public space is employed as a way to better understand the conditions for democratic participation. In this work-in-progress, artists work in relation to research regarding e-democracy using the concept of art as a method to explore the context.



Fig 1. Stage. Scene 1, 2011, Johanna Gustafsson Fürst & Kista Theatre, documentation of installation detail, Copyright 2011 Johanna Gustafsson Fürst.



Fig 2. Reconciliation, 2011, Shiva Anoushirvani, still from video. Copyright Shiva Anoushirvani.



Fig 3. Mapping Falun, 2007, Åsa Andersson Broms, documentation of process, Copyright Per Eriksson

1. Introduction

In a recent overview of the research on e-participation, Macintosh, Coleman and Schneeberger [1] show that a more informed discussion regarding the importance of form and structure in democracy is needed in the technological development in the field. As, e.g., Sæbø, Rose, and Skiftenesflak [2] point out; current research on e-participation lacks innovation in the sense that most software is adaptations of existing technologies. Furthermore, the Internet is treated as a distinct artifact and technological solutions are mostly taken for granted. These approaches have seldom been successful regarding broad and representative citizen involvement, and in particular not in more socially complex areas. Moreover, Dahlberg [3] notes that a belief in the ability of technology to shape a neutral place for deliberative discussions is omnipresent in the discourse on Internet and democracy.

We are skeptical against a technology strongly influenced by a liberal notion of democracy as an egalitarian sphere for reasoning, rather than, e.g., a Foucauldian notion of hegemonic discourse shaped by power relations. The question then arises whether there are other complementary approaches to the field. Our approach is more along the line with Nowotny, Scott, and Gibbons [4] suggesting that socially embedded research could give way to more robust forms of knowledge production.

Therefore, we have recently started an art and research project exploring how an unconditional conversation about the common and socially shared space can take place in practice. In contrast to a technology driven approach, the argument is that art projects can be used as forms for both investigating and creating multimodal mediated participation. Furthermore, thematic art projects can be used as a way of prototyping for participatory democracy. Artists' actions, installations and role-playing create a direct

confrontation and interaction with a specific place and its inhabitants to explore the dynamic relationships that constitute its context. The notion of art creates a certain focus and expectation of seeing something beyond the everyday perception. We would like to see art as what Metzger [5] calls a “democratic technology” – an informal context that provides an unconditional opportunity to try different positions and opinions.

Since the participatory turn in the 1960’s, art that more directly includes the audience in the performance or the process has been thoroughly investigated. [6-7] Today, participation as an aesthetic component is common in the nomadic context of contemporary art. However, we think that too often, the critical potential in participatory art is reduced to symbolic gestures. We want to overcome this by situating a participatory art project in a local context and connect it with research on e-democracy, and thereby create a possibility for the art project to inform the research and vice versa. The conceptual starting point for Performing Structure is the recognition of the need to examine the norms and beliefs forming the basis of the structures and communication patterns that current technologies co-create. We are interested in the “doing” of democracy within science, and what the bases for democracy looks like. The focus is on the daily conversations in small and large groups and the mechanisms that shape these conversations.

2. The concepts of art as techniques

In participatory design, a multitude of art genres are used as a way of involving users in the process, such as probes, scenarios and role-playing. Here we won’t emphasize any particular artistic genre; instead we use different concepts of art as a way of exploring the conditions for a participatory democracy grounded in a particular context. Our techniques for exploring different perspectives on e-democracy include:

1. Subjectivity – to compare the site with other global nodes through artists’ personal experiences.
2. Conflict – to emphasize diversity and conflict rather than consensus.
3. Pain – to use the artwork as a memory-work, a technique for understanding underlying conflicts and detecting norms and behaviors.

2.1 A SUBJECTIVE COMPARISON BETWEEN KISTA-RINKEBY AND OTHER GLOBAL NODES IN PROCESSES OF RESTRUCTURING

The notion of subjectivity is strong in the avant-garde concept of art. We can reach a contextual understanding beyond statistic generalizations by departing from the individual artist’s subjective understanding of a certain situation. We situate the art project at Kista-Rinkeby, which is the home location for the e-democracy researchers. This is one of Stockholm’s more expansive suburbs, and a central location for global companies primarily in the information industry, and both Stockholm University and the Royal Institute of Technology in Stockholm have chosen to place parts of their operations here. It is also home for programs, such as the government-funded Spider (The Swedish Program for ICT in Developing Regions) which, among other things “exports” e-democracy to developing countries. Kista-Rinkeby is characterized by extreme local segregation, and those living there are not generally the same ones working there. The unemployment rate among the local residents is high as well as the proportion of immigrants. The place illustrates the new divisions created by globalization, where diverse socio-economic worlds become wrapped up in each other and where the state’s ability to balance differences has declined.

Here, technology has not decreased but increased disparities as the importance of social and cultural capital has increased in the networked economy in general. The latter is not unique to Kista–Rinkeby and in order to compare the site with other global nodes through artists' personal experiences, we invite artist from different peripheral nodes heavily restructured by the global system. One participating group is The Khoj International Artists' Association in Delhi, an arts organization where artists work in dialogue with the space at the intersection between art, society and urban development. The Moldavian artist Stefan Rusu uses art as a way to talk about social and political phenomena. He is also the leader of KSAK Center for Contemporary Art in Chisinau, Moldova, and has developed art projects throughout Europe, the Middle East and Asia, focusing on processes and changes in post-socialist societies. The Lithuanian artists Nomeda & Gedimina Urbonas also explore post-Soviet notions of changing national identity, and the conflicts and contradictions caused by the new economic and political conditions. They started JUTEMPUS interdisciplinary program for art in Vilnius, and VOICE, an online publication on media culture. In Kista-Rinkeby these artists will work in close relation to local Swedish artists and local organizations.

2.2 CONFLICT AND DIVERSITY AS A TOOL

Unsurprisingly, and as various social media has demonstrated, communication technology, is not necessarily alienating. It can instead support previously fragmented groups to keep together and provide the means for new communities with a shared interest to form and interact. Technically, it seems to be easier to lump together similarities rather than differences, and to design services that offer us new products and friends based on our previous choices. The technology thus niches us, shatters us, and makes the common areas of understanding lesser and easier to avoid. It is difficult to get along with “the other.” But in order to develop an understanding of the common it is not enough to talk only to people who think and act like us. A technique that is not based on combining equals but different varieties appears here as a discursive democratic utopia. In the choice of artists, we have therefore tried to see beyond our own aesthetic practices while creating a heterogeneous group of artists. By bringing together artists with different experiences and modes of expression, we are promoting a situation of conflict where the individual artists' subject positions are questioned.

Conflict is also a recurrent theme in art, where the individual artist is supposed to be in conflict with the collective system. An avant-garde artist breaks with the norms and differentiates himself from ordinary men and previous art. Standard in these settings is that an artist's role is created through a differentiation process, where an outsider is opposed to the norm; Avant-garde in contrast to the conventional; painting in contrast to performance, and so on. We take another direction in this project and depart from our different perspectives; deconstructing the norms that create a difference while looking for a common denominator. To avoid locking into just one perspective, ten invited artists and artists groups approach the subject from a multitude of angles such as community art, urban installation art and activist art. The artists are using locative and interactive media, as well as more traditional artistic techniques. The particular art genre is not important here; a common denominator is that the artists work with situation-specific emancipatory art projects that in various ways relate to the physical and mediated public sphere. Therefore, we do not emphasize a particular artistic method, but rather the *actual meeting* between the artists and the procedures for dealing with differences. Using the thematic exhibition as a framework, different artistic perspectives create a triangulation of methods where a more diverse and complex picture of the situation can emerge.

2.3 THE COLLABORATIVE DEVELOPMENT OF THE EXHIBITION AS A MEMORY-WORK

Through the joint development of a theme, the group exhibition works as a special form of knowledge building. This has similarities with Frigga Haug and others' method of *memory-work*, [7] i.e., a qualitative method that uses the memories of a group of researchers to investigate norms and social structures. This use of personal experience as a tool for academic analysis is based on Husserl's systematic attempt to examine the subjective unconscious where he argues that we can reach a general understanding of a phenomenon by understanding the individual's experiences. [8] The idea behind the memory-work method is that memories often derive from situations where we have experienced a taboo or a cultural constraint that caused a conflict. But to get to the underlying experience that caused the memory, one must see through cultural norms and behavioral patterns. The memory-work method is specifically intended to reach to the underlying experience. To achieve this, one begins by describing the individual's own conscious memories. The collective analysis of each memory is then intended to identify the underlying conflicts and to detect the cultural norms and behaviors involved, i.e., the very reason for why the memory has become a memory.

In the project, we consider the similarities between the memory work approach and the thematic group exhibition and develop our own method of collective knowledge production. Within the framework of the arts organization *Association for Temporary Art [a: t]* Åsa Andersson Broms, Nils Claesson and Karin Hansson previously carried out a series of thematic art projects and exhibitions related to the information society and the changing conditions for democracy: *Best before - on the Information Society*, Tensta Konsthall (1999), *The Art of Organizing*, Gallery Enkehuset (2000), *Money - a commentary on the new economy and Public Opinion* at the Kulturhuset in Stockholm (2001, 2002). Central for the work is the collaboration between the artists and the ambition to create something beyond the multiplication of the single parts. This way of working with a thematic art exhibition has many similarities with the qualitative research method of memory-work. The artist most often departs from his or her subjective experience of the chosen theme and focuses on the elements that he/she thinks are interesting. What is interesting most often means some form of unresolved conflict that chafe at the individual or societal level. The motivation for making art is to a great extent about the need to express a subjective experience/interest on a structural level where others can read it. The collective process in a group exhibition, where artists share their ideas and reflections with each other, works at its best as a collective memory-work where the discussion of ideas creates an understanding of underlying conflicts and detects the inclusion of norms and behaviors; the very reason that the art has become an art work.

The planned exhibition is developed in the group of artist through a collective memory-work.

3. Artists and art projects in process

Most important in the project is the invited artists' personal engagement in the theme and interest in a joint development of the underlying ideas. To reach beyond symbolic gestures of community the privileges of the artist as well as researcher are examined and questioned.

To mention some of the ongoing and planned art works within the project: A project that already takes place in the Kista-Rinkeby area is Thomas Liljenbergs' *Kista Art City*, where a joint art project creates a starting point for a wider discussion about community participation and notions of belonging among the citizens of Kista. Shiva Anoushirvani's work takes place at the intersection between art, activism and performance. As part of the artist group RAR: Rapid Art Response she develops the project *Dear Citizenin*

collaboration with Husby Arthall. Here acts of democracy are taught through performance and role-playing.

One aspect of the theme is how technology can (or cannot) demonstrate and change social structures, and thus operate in an emancipatory direction and to broaden democratic participation. The artist Johanna Gustafsson Fürst, together with Kista Theatre explores communication technology applications related to a specific location. In the project *I'm Your Body* they use mobile GPS technology to create a parallel public place within Kista-Rinkeby.

Mass-distributed collaborative processes such as crowd-sourcing and open source are also an aspect of the technology that is interesting from a democratic participatory perspective. This is the field of Karin Hansson's work, *Actory*, a collaborative groupware based on the sociology of the art world, developed together with students at the Royal Institute of Art in Stockholm and researchers at Stockholm University.

4. Art as Prototypes for Participation

To conclude, this project contributes to the discussion about artistic research by showing how situation-specific art can be viewed as a qualitative method for highlighting and exploring discursive practices. Through a triangulation of different artistic perspectives the themed and collectively generated art exhibition creates a diverse and complex picture of notions such as participation and democracy. The artistic work is an iterative process where concrete images, scenarios and situations create a direct communication with the site. We want to see the project as a construction of prototypes for alternative societies as well as a laboratory for participation. Following a rich tradition of participatory art, we emphasize the artists' capacity to listen, interact and respond. Art is not something that comes in from above or outside. Instead it should be grounded in the activities at the site, creating meaning beyond the context of contemporary art.

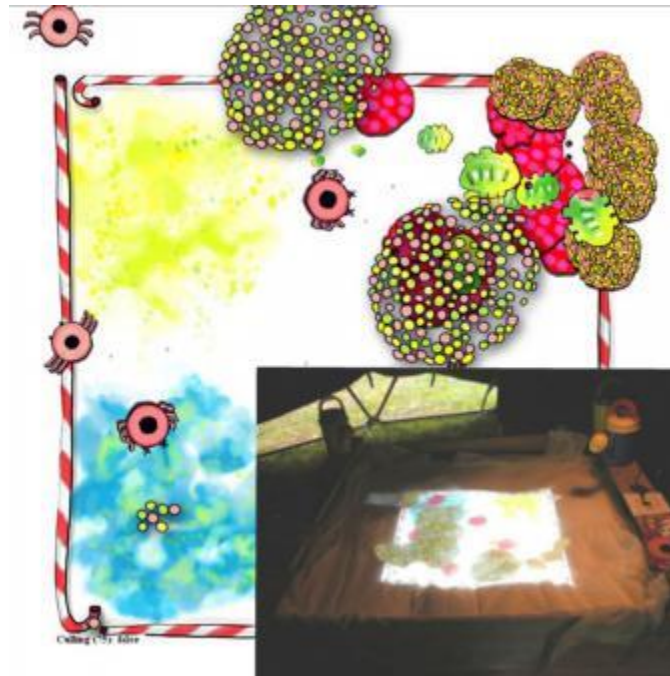
An important practical input into the project, is achieved through the activities undertaken by local organizations such as Kista Residential College for Adult Education, Husby Association for Arts & Crafts, Husby Yard and Rinkeby People's House. The artists within the project are working in direct relation to existing activities. During the spring and summer of 2012, a number of art projects will be carried out in the public and semi-public space in Kista-Rinkeby.

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CAN DIGITAL OBJECTS BEHAVE WELL (IF WE LET THEM)?

Dew Harrison



The *Shift-Life* Installation. Dew Harrison.

Within my practice I have an interest in how computer technology can augment our thinking and elucidate deeper understandings of issues and positions within the art field (see Tamblyn). In particular I have been investigating the work and ideas of Marcel Duchamp as the instigator of Conceptual Art practice and how new technologies are best suited to enable a re-articulation of them (see Blais, Gere, Manovich, Rush, Shanken, and Harrison 1999). Early works transposed his Large Glass across the internet, and inter-related Duchampian images with his notes (Duchamp 1934, 1966) into discreet offline systems. These pieces were made using hypermedia software as this enables the linking of multimedia items by semantic association rather than by indexing or alphabetic ordering (Harrison 1997). This connectivity by semantic association is paralleled in Conceptual Art where ideas are semantically linked by the artist into one concept – often presented as a visual statement, an object.

As technology advances, the interactive interfaces, which are signatures of digital artwork, can become less visible and taxing to the viewer. My work reflects this in its move towards engaging participants through intuitive interfaces with less machine-like ways of access. From mouse, keyboard and screen - to sensors, projections in physical spaces and material objects. In order to achieve more organic means of semantic association, I am now incorporating Artificial Intelligent (AI) behaviours into my Duchampian art systems to animate data objects. Recent works have bestowed the digitized Duchampian items with flocking behaviours in order to interrelate them into families of meaning, the result being more akin to a

projected animated painting in that they are not interactive and require contemplation in considering their shifting positions.

'Flocking' is more usually associated with the collective animal behaviours exhibited by many living beings such as birds, fish, bacteria and insects, but can be more largely understood as the motion of a large number of self-propelled entities (see Reynolds). It is considered an 'emergent' behaviour arising from simple rules that are followed by individuals and does not involve any central coordination. Flocking behaviours can be applied to animal-like and non-animal-like entities and the first experiments with Duchampian items are simple rather than complex, using 'Flash' to animate them. The intent is to show the criticality of oscillation required in determining the Bride/Bachelor families and shifting relationships within the Duchampian universe of objects. These are image only objects at present but when texts are added they might provide a meta-language of semantic understanding concerning Duchampian ideas, with the object/behaviour patterns lying underneath and of less interest to the viewer. They could illustrate the flux and flow of his ideas and if emergent behaviours arise may enable new discourses within the system.

It is these Duchampian experiments which have led to the hands-on installation, 'Shift-Life', by directly influencing the approach to an exploration of Darwin's 'big idea'. Instead of Duchampian objects, AI behaviours were attached to a virtual world of animated objects featured as creatures and plants that adapt to Darwinian principles for survival. These 'families' were grouped by their form and colour, and it is the changes in these identifiers that are of interest when observed by viewers who can cause physical upheavals in their world, to which the artificial families of life-forms then have to respond. The *Shift-Life* project entailed a fantasy biological life-form, 'bugs-in-a-box', existing in conditions analogous to Darwinian evolution. Interfering with the stability of their ecosystem was done through real world actions directly affecting the virtual one. The work relied heavily on the 'animal intelligences' programmed in to display accelerated Darwinian principles by allowing them survival strategies (Ch'ng).

In attempting to both respond to the idea of a young Darwin and to elucidate his adult thinking in an holistic hands-on way, the bug-like creatures in the box reflected his childhood interest in natural life-forms by taking the form of beetle-like jelly sweets and allsorts. These virtual creatures existed in a nutritional (trophic) relationship of prey/predator and vegetation with both rooted (sessile) and free ranging (vagile) organisms. They were short-lived (60 seconds minimum and 150 seconds maximum) graphically represented as 2D and brightly coloured cartoon animals. Each plant and animal type had distinct behaviours, for instance the herbivores were big, slow and lumbering, they reproduced by laying jelly bean-like eggs and could survive the toxic plants if they didn't eat too many of them. The Carnivores were quick with a scuttling gait, they could only see straight ahead and reproduced by cloning, they would die if they ate a herbivore who in turn had nibbled on a toxic plant.

In order to allow people to interact with the Darwinian 'sweet' bugs the virtual world was projected down into a real wooden box arrayed with sensors. These sensors relayed data from the visitors actions directly to the virtual ecosystem where the animals and plants would react accordingly and in real-time. As someone used a watering can to pour liquid into the box, for instance, the planet humidity altered and some plants die back, this meant less food for the herbivore green jelly sweet bugs, and consequently less bugs to eat for the pink carnivores. Switching a lamp on would dry out the atmosphere and enable the plants to grow again, however too much 'sun' might be detrimental to the point of scorching the planet surface dry and wiping out the carnivores entirely with no water and no trees for protection. The carnivores could become extinct due to their reproduction method of cloning, unlike the egg laying

herbivores. Pouring vinegar (poison) from a watering can would 'feed' the red bushes, toxic to all the creatures, but this could be remedied by pouring baking soda liquid (plant food) and restoring the plant balance, the herbivores' main food source. Banging on the edge of the box with a toy hammer caused earthquakes, which sent the carnivores into panic mode and they would spin around and run for cover under the trees. (Harrison, Ch'ng et al)

The low-tech approach to a hi-tech installation encouraged active participation but also a state of contemplation and reflection in passively observing other people's actions and watching the subsequent life-form changes taking place. The jelly bug world was set at a self-sustainable and stable level without the intervention from human meddling and as such was visually mesmerising, it was essentially a sugar-coated version of 'nature red in tooth and claw'. Through listening to the participants' conversations it was evident that there was room for deep thought, where the virtual world could be understood as an analogy for human activity and its effect on global climate change within our own real world. The animal behaviours, although quite complex with around 15,000 lines of code, were still fairly basic, but the question remains whether if given more sophisticated behaviours and left longer between the human interventions, would emergent behaviours become apparent within the social groupings of the creatures as they adapt to survive.

Both the Duchamp and Shift-Life projects await their next stages, visitors may need to view passively, observe and contemplate following any interaction with these 'live' systems, as unpredictable behaviours arise from digital objects.

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IDOLS AND ART: THE COGNITIVE FETISH

WILLIAM HART

Drawing upon theories of embodied cognition and the extended mind and the writings of maverick psychologist Julian Jaynes, this paper speculates on the function and roles of anthropomorphism and idolatry in our relationship with technology.

Objects and Anthropomorphism

In her abstract for this panel Nancy Mauro Flude concludes with the question:

“Anthropomorphism continually haunts us, and our machines – have we always been and will we fundamentally remain idolaters?”

From religion to Barbie dolls and the family pet, anthropomorphism is fundamental to the way that humans relate to the world and objects around us. We make god in our own image, and he generally shares our political beliefs and social prejudices. With dolls we can explore our social fears, frustrations and interactions with others, safe from the emotional holocaust of the playground. If we didn't anthropomorphise our pets, we wouldn't empathise with them, and they would cease to be pets.

It is through anthropomorphism that we relate to entities that we see as separate to ourselves, it is a prerequisite for empathy. However a cursory consideration for the history of human interaction with our fellow creatures makes it quite clear we are capable of being selective in our anthropomorphism.

But is it useful to anthropomorphise my toaster and worry that it may be getting bored from cooking too much toast, or fret that my bicycle is feeling rejected because I haven't taken it for a ride recently. Or that my laptop is impatient because of the time I wasted in looking at pictures of robots while avoiding writing this talk.

So the question is, with what and when should we anthropomorphise? To gain some insight into this I'd like to mash up two theories that lie outside the mainstream.

The hypothesis of the Extended Mind

The first is the hypothesis of the Extended Mind, first put forward by philosophers Andy Clark and David Chalmers in 1999. [1] Clark and Chalmers argue that cognition is not confined to the brain or even the body. As humans we have evolved to co-opt aspects of our environment to augment our thought processes. For instance we can count larger numbers using our fingers, codify abstract information using dirt and a stick, or enhance memory by writing things down on a notepad. Clark and Chalmers argue that by learning to use and rely on these external objects they become equivalent to the internal processes they augment or replace.

Under this view, my laptop is not something that I anthropomorphise, it is actually a part of me, it augments my ability to write, to remember, to visualise and to know. I don't ascribe feelings to it; in the

same way I don't ascribe feelings to a limb or organ. Before I can anthropomorphise a technological other, it has to be an automaton – an independent machine entity.

Julian Jaynes and the ability to Anthropomorphise

The second and somewhat more radical theory I'd like to discuss is by maverick 20C century psychologist Julian Jaynes. Jaynes in his 1977 book "The origin of consciousness in the break down of the bicameral mind" proposes that the structure and organisation of the human mind has continued to evolve since Palaeolithic times. [2] Our modern conscious self-awareness, the introspecting 'I', emerged only 2000 years ago under the pressures of increasingly large and complex societies punctuated by natural disasters and war.

Before then Jaynes believed that our minds were bicameral in organisation, that the two hemispheres operated independently, the left-brain dealing with the routine details of the present. The right brain would communicate with the left through auditory hallucinations in the form of commands apparently from authority figures. At first the authoritative voices were those of the chief or king, and when the chief died his would continue to be heard, and became the first gods. In their left-brain state the people were caught in the moment; lacking introspection they were capable only of dealing with normal routine. When faced with stressful situations or problems outside the norm the voices from the right would provide advice or command a course of action. Jaynes paints a picture of a peaceful ordered society where everybody knew their place, where people literally walked and talked with their personal gods.

It is impossible to do justice to Jayne's theory in a few sentences, and perhaps it sounds a bit like something from the pen of L Ron Hubbard or Eric Von Daniken, but Jaynes's scholarship is impressive and he uses his theory to describe one of the most intriguing explanations for the development of religion that follows the gradual breakdown of the bicameral mind. As the individual sense of self-awareness grew, the hallucinated voices began to fade. The insecurity and loss of certainty that this created drove humans to find ways to try and recapture the direction and wisdom of the gods, and so developed increasingly complex and desperate ways to recapture this connection. Idols, prophets, oracles, seers, prayer, divination, auguries, poetry and art were all at different times used as ways to invoke the lost voices.

For instance the idols of the early first millennium BCE had large exaggerated eyes which command attention, and Jaynes hypothesised that the large eyes of the idols aided the people in entering states where they could again hear the auditory hallucinations. It is hard not to wonder if we still see vestiges of this in the large eyes of anime characters, or in the power of television to captivate us.

Neuroscience and thinking through objects

The insight and knowledge gained from neuroscience over the past twenty years tends to support some of Jayne's ideas. Cognition in the view of Neuroscientist Antonio Damasio involves emotion and physical sensation as much as it does logic or mental reasoning. [3] We say that cognition is embodied, that we use our body and intuition as much as reason to make sense of the world. We all know as artists, that you don't make art through normal verbal consciousness, and while we no longer wait to be possessed by the Muses, we do make use of non-conscious understanding and intuition. A part of the art making process for many is an almost trance like engagement with materials as we think through our work.

Art historian Barbara Stafford talks about the power of art to construct analogy and develops a theory of art where artefacts are cognitive objects that communicate through analogical thinking. [4] In a similar way that Clark describes the way we use objects in our environment to extend our mental capacity, it is hard not to conjecture that when we engage with an artwork we participate in an act of communion or communication with it, it becomes part of our thoughts. In this view the idols of the ancient world are cognitive aids that helped them to enter a mental state where the right side of the brain could direct and advise the 'everyday' left via aural hallucinations.

Idolatry is a contemptuous term, it implies an unreasoning worship, an unfounded abasement before inanimate objects – and so it must have seemed to those who no longer entered the trance and were cut off from the voices. Did the Idolaters anthropomorphise their idols? Their relationship would have been too literal for the metaphorical anthropomorphism that later developed.

Conclusions

In pondering the perspectives that the theories of Clark and Jaynes provide, I've come to the conclusion that we need a different category to describe our relationship with our digital artefacts. They are not inanimate objects, yet neither are they in their current form alive and worthy of empathy. They are the new idols, and we engage in idolatry that extends from the naive to the sophisticated.

At the naive extreme we may anthropomorphise these artefacts and ascribe authority to what they tell us. For example television is the ultimate Idol for the naive, it places us in a trance like state of passivity as it informs and commands.

At the other extreme they are thinking tools, augmentations that we have co-opted and incorporated into our cognitive frameworks, they become part of what we are, not some other. We think with these artefacts and not so much about them.

As technological humans we are idolaters, but that doesn't mean that idolatry is unquestioning worship from those in thrall to the idols, it could be the sign of a fruitful cognitive engagement that can extend our thinking and understanding of the world to places and states that haven't been possible before.

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THE NEURO-LOGIC OF SOFTWARE ART

WILLIAM HART

This paper considers programming in relation to the International linguistics of Roy Harris and the Expanded Mind hypothesis of Andy Clark. It is argued that the use of the term 'language' when referring to programming is a category error that has implications for the practice of Software Art. Developing a practice of Software Art requires an open-ended and heterogeneous approach to coding involving a range of cognitive states.

"The computer is a kind of wishful self-portrait... a compendium of abilities we have as humans aspired to but are not very gifted at. We need a much clearer understanding of this complex relationship. Without this understanding we will be unable to find an appropriate partnership with our creations." [1]

Introduction

Over ten years ago I undertook my first software art project entitled The Writing Machine. At the time it had been some years since I had engaged in a serious programming project, and this was the first time aside from some scripting that I had undertaken programming with the object of an 'art' outcome, but I had had considerable previous experience in large and small experimental software projects. An initial prototype written in C for the artwork that had the essential behaviours was produced quite quickly, but then the project stalled - and failed to reach an aesthetic resolution. It was as though the material of the project became heavy, brittle, and eventually unworkable. I've since spent a considerable amount of time considering why. It would be easy to say that this failure was due to a poor software engineering methodology, but while making an artwork sometimes generates engineering problems, engineering does not describe the methodologies that an artist uses. Artworks rarely address a problem or provide functionality, in the way that engineering processes do. This has led me to explore the qualities of different programming languages, looking at processes for rapid development and flexible refinement, but that also allow for diversity of expression.

As part of this exploration I have looked closely at the relationship between humans and machines, between the formal constructs of programming and human language, and ask, what is relationship we have with the machine and what are the constraints on using it as a creative medium. I contend, that in considering programming as an expressive medium it is necessary to consider the types of cognitive states artists engage in and examine the concept of language as it relates to the domains of human discourse and computer programming. In contemporary times we are very comfortable with computing devices, with the idea that these devices occupy an intimate part of our lives, and the mainstream view is developing that it is valid for artists to be involved with, programming, hacking, tinkering - making and unmaking this machinery, as part of a creative practice that results in an experience called art.

The Artist Programmer

There appears to be a consensus that the artist engaged with programming as a creative medium should, as their skills develop, move from conceptually simpler to more rigorous (in a software engineering sense) programming environments. For instance from a visual programming with node based

metaphors such as Max/MSP or Quartz Composer, through customised IDE's (Integrated Development Environment) with scaffolded programming support such as Processing graduating to C++ using API's (Application Programming Interface) such as OpenFrameworks or Cinder. A common rationale is that C++ applications are faster, more extensible, capable of increased complexity and have greater robustness. In this paper I argue that software art is not software engineering, that a different approach is required, to achieve the flexibility, richness and ease of comprehension that expressive software art requires.

It isn't necessary to look too far back beyond the past decade to find a general unease with the possibility of the coexistence of technical proficiency in computer technology and creative expression. Current histories of software art often claim a heritage from the conceptual art movement of the 1960s, but few are enthusiastic in claiming a lineage from the Computer Art movement of the 60s, 70s and 80s, a movement which many would still claim failed to produce art worthy of consideration. [2]

The Program as Artefact

Perhaps this is partially because the concept of what art is has changed since these times. We have seen a move from the emphasis upon the art object to an emphasis upon relation or process. I remember reading an article and looking at images produced by Harold Cohen's drawing software AARON in the early 1980s and being disturbed and slightly enraged. Partially my discomfort was due to the article (and Cohen) ascribing intelligence and creativity to the software - whereas all I could see was software that produced pictures with recognisable forms, but that were always the somehow the same. Years later as I pondered the problems of writing software and creativity I began to realise that while it is true to say that AARON failed to produce engaging art objects or to display 'creativity'; it is the project in its entirety and the knowledge it represents which is the artwork.

Throughout the history of artists' engagement with computers, there has been recognition that something 'new' or novel is happening, a new medium, a novel approach to making and disseminating art - a different mode of expression than had been seen before.

The Computer Art of the 1970s and 80s suffered the disregard of the mainstream art establishment as much because of its inability to demonstrate the value of this 'newness' in ways other than novelty, and because of its association with the dehumanising program of hard AI and the military industrial complex. With the advent of the personal computer revolution and development of desktop publishing and image editing, the computer demonstrated an ability to simulate processes of traditional media (at first quite crudely and was met with a degree of scepticism by practitioners skilled in traditional analogue media). It was this ability to firstly approximate through simulation the processes of traditional media and then such as with the case of video quite quickly surpass the processes of analogue media that led to the general acceptance of the computer as a tool for artists - not its capacity for novelty.

The novelty of Computer Art?

What is this new thing though? Dominic Lopes in "A philosophy of computer art" makes a distinction between Computer Art and Digital Art, the latter he defines as art which rely upon the ability of the computer to encode and manipulate data, and is not a new art form - a digital image is still an image, digital music is still a kind of music. [3] Computer Art he defines as art works, which when run on a computer have a quality of interactivity. So for Lopes the 'new' thing is the quality of being interactive. Interactivity

as the prerequisite of difference alone seems to hark back to the new media of the 1990s as a way of distinguishing the 'newness' of art made with the computer. For the purposes of this paper I would like to instead explore this idea of 'newness' as being a cognitive loop between artist and computer, rather than as a dialogue the artist has with the computer or something that the artist expresses through the computer. Digital Art is now the mainstream, it is ubiquitous and its tools of production are invisible. There are numerous social and political problems with the solely media centric approach of digital art, but they are not what I want to address here. Instead I want to look more closely at the processes and context of the engagement between human and computer we call programming, and how it could result in a thing we call art, particularly where the artist and programmer are the same person.

I would assert that this activity we call programming is more than a utilitarian or instrumental one, that the requirements for a programming environment are different for an art activity than for an engineering one. An art project may have non-specific goals and will certainly have different criteria for determining points of completion. Art historian Barbara Stafford places analogy at the heart of the art experience, in making, as much as receiving art we are engaging in 'analogical thinking', satisfying art experiences generally engage through either an unstable and shifting meanings, or in a richly nuanced web of correspondences. [4]

Analogy, Language and Programming

Analogy / Metaphor is very powerful, it is arguably the essence of cognitive process, it gives the power to create and manipulate complex abstractions. Where analogy is in constant use it becomes invisible, and we cease to be aware of the underlying assumptions. We all know that programming languages are not the same as human 'natural' languages, but implicit in almost all theoretical discussion is the idea that on some level that it is. We talk about codes, and encoding interchangeably between analogue and digital, between organic and machine systems. But what if there is no correspondence between language and programming dialects.

There have been a long history of technological metaphors used to describe aspects of human cognition; many have become deeply embedded in consensual language and understandings. For instance the telegraph and telephone exchange were common metaphors for brain function in the early 20th Century, the photographic image as an analogue for visual perception is still a widely held naive conception. The computer as an analogue for the brain, and software for the mind, has been widely used for the past 50 years, although it is also a metaphor that is violently rejected by many. Sometimes terminologies that have been analogised from one discipline of thought to another create a further implicit confusion. Take for instance the term 'ontology' it has distinct (but analogous) meanings, whether you are discussing philosophy, cognitive science or computing. In philosophy ontology is concerned with the existence and relationships of categories of being, whereas in information science ontology is a representation of a domain of knowledge based on a formal description of concepts and relationships, taxonomy and properties. So in one discipline ontology is metaphysical; open to interpretation and in the other it is formal; precise and closed. When we discuss ontologies in terms of art and programming there is naturally a bleed from one conception to the other, a confusion between metaphysical and material modes of expression.

In the early 1950s, at a similar time to the development of the first computer programming languages such as FORTRAN and LISP, Noam Chomsky developed his linguistic theory of Universal Grammar, that is, there is a universal structure of grammar hardwired into the brain, with the implication that all human languages share a common set of fundamental rules, a formal description. Programming languages are 'Turing Complete', that is formally a logical construction in one language can also be represented in another, even though the code and logical structures of the programming languages may be quite different. Chomsky also constructed a hierarchy of formal languages, with Turing complete formal languages at the lowest level, and several levels of more complex formal grammars above that. The implications from Chomsky's theories were clear; all human languages were syntactically equivalent to each other, as were all programming languages, with programming languages being a simplified version of the languages of humans. So the idea that we think and communicate through code entered the public consciousness and was firmly embedded through the use of terms like programming 'language'.

To understand how prevalent was this assumption it is instructive to look at the history of machine language translation, the optimism in the field in the 1950s repeatedly asserted that machine translation was a problem that would be solved in the near future. [5]

Cognitive Psychologist and author Steven Pinker currently champions the idea of a Universal Human grammar, and popularised Chomsky's theories widely in his 1994 book "The Language Instinct." [6] But the theories and debates around the acquisition and representation of language in the mind are complex and vigorous, and there are a number of opposing theories to this idea that language is in some way hardwired into the brain.

BUT IF LANGUAGE IS NOT A CODE...

One of the theories that Chomsky's Universal Grammar displaced was the Sapir-Whorf hypothesis or linguistic relativity. The hypothesis, briefly stated, is that the language you speak with determines what and how you think; the form and structure of different languages can be unique, which lead to different conceptions and understanding of the world. In recent years the credibility of the Sapir-Whorf hypothesis has been revived by the work of Cognitive Psychologist Lera Boroditsky. Boroditsky looks at indigenous peoples and their languages, and how constructs available in the language they use affect the way they interact with each other and their environment. For instance she describes how some languages such as Kuuk Thaayorre spoken by indigenous people in Northern Australia, do not have concepts for relative spatial location such as left and right, but instead always use absolute directions, for instance they would not say you are in front of me, they would say you are to the north. Consequently people who natively speak this language always know where they are orientated, a characteristic not shared by people who use languages with concepts of relative location. [7]

AND COMMUNICATION IS MORE THAN LANGUAGE...

Integrational Linguistics is a branch of linguistics that was developed by Oxford scholar Roy Harris during the 1980s. Harris criticises what he denotes as the "language myth" that dominates Western linguistics. Integrational Linguistics rejects several implicit assumptions in conventional linguistics, particularly the idea of communication occurring through a system of signs that have a meaning and existence separate from the context in which the communication is occurring, or that human communication occurs through a mechanistic process of mental formulation – the idea that meaning is encoded into speech

where is it transmitted to the listener who decodes it into a mental representation. Consider an example of integrated communication, if I am carrying a load of heavy boxes, and I ask you for help, you assess my difficulty and take a box from me, to which I respond 'thanks'. We have engaged in an integrated act of communication involving spoken word, gesture and physical action. For the Integrationist, communication is always a collaborative creative act steeped in the context of the participants, it relies as much on physical acts or responses as it does on verbal or signs. [8]

Cyborgs: thinking through objects

Embodied cognition is the theory that a body is essential for thought, that physicality, sensation and emotion are essential components of mind. Philosopher Andy Clark takes this a step further with the theory of the Extended Mind. In the extended mind hypothesis the mind can extend beyond the brain and body into the external environment through objects such as notebooks as part of the cognitive process. In the original paper Clark and Chalmers argued that if a person, Otto, has Alzheimer's disease and routinely relies on a notebook to act as his memory, the notebook is not merely an instrument, but under Clark's parity principle is cognitively equivalent to a normally functioning memory. As Otto's cognition extends to his notebook, it is effectively his memory. Clark contends that humans are naturally cyborgs, creatures who routinely cognitively co-opt artefacts. [9] Interviewed on Australian radio Clark relates a story about how once when he lost his laptop it was the cyborg equivalent of having a stroke, which left him shaken, dazed and confused, its impact was worse than when he had an actual mild stroke several years later. Most people who have lost a laptop and through it engage with the world of ideas will relate to Clark's anecdote.

After pondering the idea of the dynamic and creative process of communication that Integrational Linguistics describes, which relies little on the transmission of coded signals but upon body, environment, history and context to develop understanding, or the way that the Extended Mind hypothesis argues that we use the environment around us, it is hard to continue to think of artworks as static objects, but as dynamic cognitive systems which draw us into a dialogue of analogy and sensation, or as Barbara Stafford describes them, "echo objects." [10]

Software art is interesting philosophically and cognitively not just because of its potential 'newness', but because it sits at such a distinct interface between formal logic and fuzzy expression.

Conclusions

When we engage in programming, although we use terms like 'language' and 'writing' we are not engaged in discourse with or through the computer, but are engaging in an act of cognition. This extended cognitive state involves a variety of different modes as the software develops through; inspiration, discovery and exploration, experimentation, play, construction, reflection, analysis and intuitive modelling. When engaging in a creative process through crafting software, it is not enough to just string a sequence of function calls together, or to solve a complex technical problem, or to demonstrate the capabilities of an algorithm. It is the engagement with the full spectrum of cognitive modes that leads to a resolved creative outcome.

Many of these cognitive modes are common to all forms of art practice, some like the one I have labelled discovery and exploration are more specific to software art. To move a project beyond its initial

inspiration may require lengthy exploration to find a way to proceed or a form to follow. Intuitive modelling or tweaking is unique to technical processes, as a program is developed there are often a large number of arbitrary variables that control behaviour and other qualities. Mathematicians refer to this as a parametric phase space, the multidimensional space describing the range of possible behaviours the program has. A key (and often very time consuming) aspect of the development of the program as an artwork is exploring and experimenting with different values and combinations of parameters. It is through this play that an intuitive sense of the shape and form of this phase space develops which leads to the final selection of values and consequent behaviours.

As an artist-programmer I advocate adopting hybrid approaches mixing languages with high levels of abstraction with low level high performance code based on the type of cognitive engagement being undertaken. I am not trying to engineer an application or create aesthetic code. I am struggling to enact a process of communication with the viewer.

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SUSTAINABLE PRESERVATION PRACTICES AND THE RHIZOME ARTBASE

Nick Hasty

Founded in 1999, the Rhizome ArtBase is an online archive of new media art containing around 2508 art works, and growing. The ArtBase encompasses a vast range of projects by artists from all over the world that employ materials such as software, codes, websites, moving images, games and browsers to aesthetics and critical ends. The paper documents the past, present and future preservation practices of the Rhizome ArtBase.

As laid out in our mission statement, Rhizome supports “artists working at the furthest reaches of technological experimentation.” A major part of this mission is the preservation of works of art, through our online archive, the ArtBase. There are two fundamental threats to this preservation: diffusivity, and digital obsolescence. We will explore these risks respective to works by artists JODI and Golan Levin, as a basis for approaching solutions that may mitigate these risks.

INHERENT VICE & ARCHIVAL MATERIALS

Diffusivity is a term that refers to works whose content is not contained within one digital object. In some instances this can refer to works that reference external databases, or dynamic and real-time data sources but also refers to works that exist primarily as a series of actions over a variety of locations and platforms. [1] These works present a structural complexity that creates new problems for the archive. An early example of a static, non-diffuse work is Olia Lialina’s *My Boyfriend Came Home from the War* (1996). The piece consists entirely of HTML documents and GIF images contained in directory that could be easily duplicated and stored in the ArtBase. A work that is diffuse presents a structure that is diametrically opposed to objectification and ownership. *Globalmove.us*, by seminal net.art duo JODI, is a glitch website that implements HTML, Javascript, and the Google Maps API. Through the combination of the API and home-brew Javascript, the artists have created a website that negates user interaction, and creates frenetic, drawings using Google Maps interface elements. Here, the functionality of the art object entirely hinges on an external element - the Maps API. Sooner or later, JODI’s Javascript will be rendered ineffective as a result of further development of the Google Maps API. What steps might be taken in order to mitigate this?

The primary mission of the archive is to stabilize the unstable/external element (the Google Maps API). Here, a need emerges for institutions such as Rhizome to collaborate with private sector institutions such as Google. It is simply a reality that corporations and other third parties create and control much of the materials that are used by the artists we support. While it would be unthinkable for Rhizome to host an archived instance of the entirety of Google Maps, a truncated version including the functions and data called by JODI’s piece could be created. With this action taken, the API is no longer an external element and it’s fixity is ensured.

Next, we will explore the inherent vice of digital obsolescence as illustrated by *Floccus* by Golan Levin. Digital Obsolescence is perhaps the most pervasive threat to digital works. New media at its very core is built, and manifested with tools and technology that are interdependent – no element of software is autonomous. There is no artist or programmer who is not dependent on (or limited by) infrastructure built by other programmers. An artist who writes software, relies on running within a specific

(or at least a finite range of) operating system(s), and therefore on specific hardware. A recent case of obsolescence was illustrated by Golan Levin's *Floccus*. This piece created in 1999, has to date witnessed two generations of obsolescence. Levin originally created the piece using the C++ programming language and OpenGL (Open Graphics Library). It was then compiled as a java applet capable of running either as a "stand alone" piece of software, or as an element embedded in a web page. In the intervening seven years after its creation in 1999, computer systems evolved and support for the applet began to disappear. In 2006, the artist found that the applet began to fail, and would no longer run on many contemporary systems. Levin remedied this by recreating the piece using Processing (a tool that emerged after the work's first iteration). This process also rendered an applet, which Levin embedded on a page of his website.

Floccus was once more rendered obsolete; until recently the web-based applet would not run, and visitors to Levin's site or the ArtBase would be presented with only a blank white box and error message. After investigating the issue, Levin found the problem to be that the applet was compiled to run on now obsolete 32 bit systems. Today, 64 bit systems are the predominant norm, and prior to its repair, the applet was likely unusable for the majority of visitors to his website. This particular case is a perfect example of the recurrent nature of obsolescence; once an obsolete art object is restored, it is only a matter of time before the solution is rendered obsolete. The most evident repercussion is the work of art no longer exists from the viewer's perspective. Without action, obsolescence creates an air of mythology – an inaccessible history. Levin's *Floccus* presents material gathering needs specific to compiled software. Unlike a web page's uncompiled markup language, readable by both machines and humans, once compiled source code forms a stand-alone applet or other form of software, accurate human analysis of the work is made impossible. Compiled applications do not allow for the ability to understand the artist's programming logic, structure, and style. In a restoration scenario, this information is integral. In the case of *Floccus*, there are five primary entities that must be gathered to form the archival package: the Processing source code, a font file that is used in the piece, the compiled Java applet, the compiled P3D Processing Applet, the original 1999 C++ source code, and the compiled software of the C++ version. With the description of the work, the images of its documentation, and analysis of the various formats of source code, there is ample information to inform accurate reinterpretation in a restoration scenario.

STRATEGIES AND METHODS OF RESTORATION

Beyond gathering of archival materials for the stabilization of works, there are three commonly acknowledged forms of restoration: emulation, migration, and reinterpretation. This section will explore these established methods within the context of the previously discussed works. Through this theoretical exploration, and the findings of the Variable Media Network's case studies, an analysis of how relevant these methods are to the ArtBase will be provided.

Emulation is the simulation of the architecture and behaviors of an old computer system, within a contemporary system. [2] For instance, if an art object will no longer run on contemporary operating systems, a piece of software may be written that emulates the environment of the work's original operating system. This strategy is efficient insofar that the emulation of one operating system creates a solution for accessing all works that originally ran on that system. Still, it is only a temporary solution – with time the emulator itself will become obsolete and unusable on contemporary computer systems. While case studies have shown that emulation is effective at producing an aesthetically authentic iteration of art objects, these studies have also shown that it is fact quite a in-depth process best suited for circumstances that justify a high level of investment in a short-term solution. [3]

Thus it follows that the prerequisite for restoration efforts is not simply for a work to function outside of its original format, but to a broad base of rapidly evolving web browsers and operating systems. Deprecation and obsolescence is a necessary evil for an evolving Internet. Yet, software efficiency and the politics of emergent web standards is a concern secondary to our goal of having the ability to properly support a chronological legacy of internet based culture and creativity. This establishes the need for a “museum quality browser” – one that runs on contemporary infrastructures and provides legacy support for archaic protocols and markup of the early days of Internet art. Rather than adopting a policy of deprecation, such a browser would be built on a development philosophy that is additive, providing native support for emergent standards and preserving support for the old. Building upon open-source frameworks such as WebKit, or Gecko would be ideal as they come from a rich discourse and community of developers. This model is flawed however, in the sense that it would require the user to download and install an entirely new browser. As nearly all commonly used web browsers (i.e. Google’s Chrome, Apple’s Safari, Mozilla’s Firefox) are built upon the aforementioned open source frameworks, it would be ideal to initiate collaborations with these parties, so as to aid in the development of more preservation-friendly development practices. The realization of this model as a browser extension or feature native to these browsers would be a more sustainable model, as it asks less of the visitor, while theoretically offering the same result. While emulation is a term not often used when speaking of web content, that is essentially what the model proposes – an environment that will provide support and access to art objects that are otherwise inaccessible on contemporary systems. However, while previously it was posited that emulation was not a viable solution for the ArtBase, this model is feasible and sustainable, as it provides a singular solution for the majority of the collection.

Migration is the practice of converting digital objects from obsolete formats, to contemporary formats. For example, if the .JPG image format was in the beginning stages of deprecation, works in the ArtBase that employed use of this image format would be identified, and their .JPG assets would be converted to a more stable format. While migration does present a viable solution for the management of digital assets, it assumes a high level of access and interoperability. For example, migrating a format such as .JPG is viable only because it is a format that is interoperable with many different forms of image editing tools. Lossless migration from .JPG to a new standard does not require access to any sort of source code, so long as there are tools that can interpret it. This approach becomes more challenging when considering the whole of the ArtBase, as many works include less interoperable proprietary compiled formats, such as Shockwave Flash files (.SWF), and require access to specific editing software (Adobe Flash) and original source files (.FLA, Actionscript) in order to approach migration. While migration is a fundamental component of preservation, within the context of the ArtBase, it will over the long-term be best suited for application to simple digital objects such as images, sound, and video.

Where migration offers a simple process of continual upgrade, works whose primary form is a compiled piece of software, such as Levin’s Flocuss, require a more involved process – referred to as reinterpretation. [4] When a piece of software no longer runs on contemporary infrastructures, one cannot simply convert it. Reinterpretation calls for delving into the uncompiled source of the software, and repairing whatever is the root cause of its obsolescence. In some cases this may be as simple as altering the format of the compiled software, while in others it may call for a fundamental re-write of the software’s source code. In such cases, this is only made possible by having access to the software in its uncompiled format. In the most drastic of situations, documentation of the functional work, along with analysis of the work’s source can offer a path to creating a faithful reinterpretation. The sense in which emulation is not feasible for the ArtBase is applicable here – the thought of distributing emulators for visitors to the ArtBase to download in order to run the various software based works asks much effort on the users part.

MONITORING A GROWING COLLECTION

With a rapidly growing collection currently containing over 2,500 works, each consisting of complex digital objects, an automated system for monitoring obsolescence is crucial. Although the ArtBase recently adopted a new collection policy that accepts only archival objects, it continues to suffer from the past acceptance of “linked objects.” These works exist solely as records, which link to the actual digital art object hosted by the artist, or third party such as a museum. In such cases, Rhizome has no control of the sustained access to these works; they exist in the ArtBase solely as catalog entries. If the artist removes the work from their server, stops paying for web hosting, or modifies the URL, access to the work from its ArtBase record is eliminated. Efforts are underway to transition these works to full archival records hosted by Rhizome. Fortunately, verifying a URL can be fully automated, yet monitoring anything more complex than a dead URL requires a more nuanced approach. Rhizome is currently researching the implementation of a tool (such as the UK National Archive’s DROID and PRONOM) that will allow for reports to be automatically generated on the digital object representation formats present in a work, which will in turn allow for the identification of works which implement an obsolescent format. The problem remains however that issues of browser support and obsolescence most often do not manifest themselves in a discrete manner that can be identified through automation; there is no way to write an algorithm that asks to search for anything that “doesn’t look right”. In the context of the ArtBase, the most effective means of identifying these complex problems is a human one. Providing users of the ArtBase with a simple and helpful means to report problems with an art object offers an effective means for identifying dysfunctional works. Once a user has reported a work as being in some state of dysfunction, it can be investigated for the root of the issue.

FUTURE INITIATIVES

A major wealth of material not collected by the ArtBase is the ephemera produced by the artist. Whereas the artist working with physical materials produces ephemera such as sketches, plans, notes, unfinished works, and studies, these materials are typically not collected until after an artist passes, or late in their career. For the artist working in an entirely digital environment, what is the likelihood of these peripheral documents surviving? During the life of one artist, many computers will come under their command, and while their finished works may persist in archives, what is to come of the ephemera contained on the studio environment of their hard drive? By definition, ephemera fall outside of the scope of most collecting institution’s immediate interests. It simply constitutes far too much material when considering the sheer quantity and the inability to predict what will be worthwhile. It is undeniable that some day this material will be valued. A unique example where this was executed successfully (through a combination of good fortune, and expert digital forensics) is the Rushdie archive at Emory University’s Manuscript and Rare Books Library (MARBL). Here they preserved and emulated the personal computer of author Salman Rushdie. While Rushdie was not a digital artist per se, the computer was in fact his studio environment. MARBL preserved the ability to observe Rushdie’s digital manuscripts, drafts, notes, sketches, and correspondence. This is a teachable moment in the value of digital ephemera. What provisions can be made to ensure that future generations will have access to not only preserved art objects from our time, but the ephemera produced by these artists? It is in the best interest of stakeholders to strive for developing tools for the artist that will allow for some form of self-preservation, as well as integrating these materials into the scope of interest.

A DEMAND FOR COLLABORATION

For Rhizome and other collecting institutions and repositories, the path forward is clear: interdisciplinary collaboration. Institutional and disciplinary boundaries often keep innovation and progress within their respective silos of knowledge. Within the field of technology there are powerful stakeholders far outside of the art world and museum community, who have made advances and built tools incredibly useful to collecting institutions such as the ArtBase. It is vital to expand collaboration and communication, and for institutions such as Rhizome to seek consultation from such fields. The model of collaboration forged by the Variable Media Initiative is a scalable one. The VMI was intentionally composed of diverse institutions at the top of their respective domains, be it Internet art, performance art, or collections of variable new media. Each institution offered their field specific knowledge, resources, tools, innovation, and research. This aggregation of wisdom is necessary on a broader scale, spanning public and private sector communities of computer science, digital forensics, software development, open source communities, information scientists, archivists and museums. In 2002, Richard Rinehart concluded his paper "Preserving the Rhizome ArtBase" with the following statement, "Rhizome will make a unique, significant and feasible contribution to digital preservation efforts by proposing and testing solutions for metadata and policy as outlined above." In a moment that sees the ArtBase transitioning to a truly standards based archive, this statement remains to be true. Rhizome continues to devote itself to the sustained preservation and universal access to the cultural history reflected by the intersection of art and technology.

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ZEUGMA

ANNA HATZIYIANNAKI

«Zeugma» is the title of the New Media and Mixed Media Art Project, inspired from the Hellenistic twin city Zeugma, now covered by the river of Euphrates. So, six Greek young Artists, traveled to Istanbul, also a twin city built on the two banks of Bosphorus to experience a cultural zeugma, in such a way, that to implement it in contemporary artworks.

Introduction

Zeugma was an important Hellenistic city on the opposing banks of Euphrates, in the area of the contemporary South - Eastern Turkey, comprised of the twin cities Seleukia and Apamea.

In 2004, six young Greek Artists, being aware of the Zeugma project, traveled to Istanbul to live in situ the experience of a “zeugma”, in such a way as to allow them to implement the knowledge in contemporary artworks. In the Greek language, “zeugma” means “link”. The term, or word, can be applied to any place where dissimilar elements meet, co-exist and are bridged together in harmony.

They were searching in modern Istanbul for a “zeugma” of Ancient and Modern times, for an intercultural node of East and West. Though the idea to transform the concept of “zeugma” in contemporary artworks was started from the twin Hellenistic city, the workshop finally took place in Istanbul which is also a twin city built on two sides of the Bosphorus.

Istanbul was the apple of Eris among many claimants in the old times, but also the cultural meeting point of ethnicities that were living around the no-border areas of East-Roman, Byzantine and Ottoman Empires. It remains a hub for Balkan – Mediterranean and Eastern areas, a kind of a timeless Cultural Capital. The goal of the Greek artists was to bridge through their artworks concepts like: “Diversities”, “Past and Modern Times”, “Local Culture and Intercultural Digital World”.

Brief Analysis of the Project

Key Notions: The artworks that emerged from that journey - workshop, carry the following key notions: “Twin Elements”, “Vis-a-vis in a Mutual Axis”, “Contra Position”, “Nodal Point”, “Joint”, “Sacred and Profane in a Dialogue”, “Intercultural”, “Inter Religion”.

ART "GLOSSARIES":

They have investigated art "glossaries" to conclude that they may be links among all kinds of cultural diversities.

MEDIA:

They used mixed techniques and media. Techniques like constructions and installations out of Metal, Electric Light and Plexiglas. Media like, Video Installations, Interactive Multimedia Installations, Video Performance and readymade.

THE AESTHETIC IDEA:

Avoid to undermine the autonomy of diversities, but rather link them, building a horizontal network without any hierarchy, like a kind of cultural rhizome. Is this perhaps the bet of the 21st century?

The Artworks

"PRAYER"

By Constantine Tiligadis, Multimedia Interactive Installation, 2006.

Jesus and Allah meet each other harmoniously, into the interactive work "Prayer" of Constantine Tiligadis. It is a Π shaped installation. In its central side, a digital picture is projected displaying two hands in prayer. An audible environment is activated by the visitor's presence. It is either a Byzantine or a Muslim prayer, depending on where the visitor stands, while it is possible to hear a symphony combining both prayers. Tiligadis ponders on the everlasting subject of Truth. In Istanbul, which is full of temples and mosques, he focalizes on the meaning of the word "faith", the backbone of every religion according to Emmanuel Kant.

"THE MEMORY OF POLIS"

By Andreas Sitorego, 3D Animation, 2006.

The geographical and urban structure of Istanbul, as seen from Galatas' bridge, inspired Andreas Sitorego the idea for the digital work "The memory of Polis". Using a 3D animation technique, he presents three interlocking bones moving very slowly around their common joint, and allowing through their transparent material on their imaginary axis of abutment to slowly emerge a faint kaleidoscope effect. A note of the artist in Istanbul states:

Spirit and matter have been kneaded by the experienced hands of time, offering unsparingly to the next generation the magical remnants of the faiths gone by, etched into the material.

"BORDER"

By Andreas Sitorego, Video Art, 2006.

The artist sets a double projection (on the floor and on the ceiling on the same vertical axis) of a nautical cork that floats on the surface of the water. The viewer becomes a bridge between the elements of air and water, elements that he perceives from two opposing sides. The viewer stands in the middle of the two worlds the aquatic and the ethereal. While on the ceiling, the image of the cork in the water is like someone is watching it from underwater. The other projection, on the floor, shows the cork as it floats on the surface of the sea.

“FEEDBACK”

By Ioanna Myrka, In situ installation, readymade, electric light.

It is an in situ installation, made of used empty carton boxes and electric light. It is the disposable packaging of Today's Consumer Society with standard decals for evaluation and information about the content, identity, distinctiveness and evaluation. For Ioanna, this is

the leftover traces of a civilization that we throw away and in which the air is now stored in those carton boxes. It is garbage, collage and pieces of Time, the image of Polis from afar, a puzzle that is somehow dirty, somehow arbitrary, anarchic and random.

“SPHINX”

By Yannis Melanitis, Video Art, 2006.

The lens focuses on the face of a woman which is stone like. She portrays the new Sphinx. The theme derives from the ancient Greek Sphinx, a hybrid of a triple nature – with the head of a woman, the body of a lion, and the wings of an eagle, a treacherous and merciless creature. Those who were unable to answer the riddle of this mythical creature were killed and eaten by her. The contemporary Sphinx, while talking to herself, places a new riddle:

My definition of Man is not a riddle.... every word I say comes out of my despair about language... Language is my greatest problem.

“THE HOLY LIQUID”

By Andreas Lyberatos, Installation of 2 sculptures, 1 painting, electric light and readymade objects, 2006. These three works have been fitted in such a way as to create the impression of a sacred place. The central composition is the figure of a human head that insinuates its shape and receive a kind of Holy Communion from the electric light. The other two wall-mounted works are facing each other. One is sculptured while the other is a painted composition which consist of variants of the central figure. The human head opens into two profiles looking at each other while they are connected with thin tubes, representing aquifers that end between the faces in a composition of transparent water glasses. The correlation between the human body and the holy place arises from artist's state:

The body as a building, the face as a whole city, the whole body-city, shaped as a church, fallen on its knees, praying. The shape of the cross on my face.

“VIDEO PERFORMANCE”

By Helena Poca, White dress with hook mechanisms, everyday objects and video projection.

Conclusion

The first presentation of the artworks that emerged from the journey – workshop in Istanbul in 2004 with the collaboration of the Centre for Contemporary Art of Rethymnon, took place in 2006 with a

group exhibition at the archaeological site of artillery tower at Rethymnon, Crete. The project remains open with the same or an enriched form at other cultural zeugmas.

We can say that this project applies not only to the lost Hellenistic city and to contemporary Istanbul, but also to all Mediterranean areas because this exceptional Sea is a kind of liquid zeugma among Asia, Africa and Europe.

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A PAINTERLY APPROACH TO 3D COMPUTER GRAPHICS

ANTHONY HEAD

This paper is a review and exploration of the work over the last ten years of Light Years Projects, a collaboration between Jeremy Gardiner and myself. It covers in particular how I have explored the notion of a painterly approach to real-time 3D computer graphics. It deals with the tensions, temptations and opportunities that lie in the area where landscape painting crosses with technology, concluding with some of the lessons I have learnt.

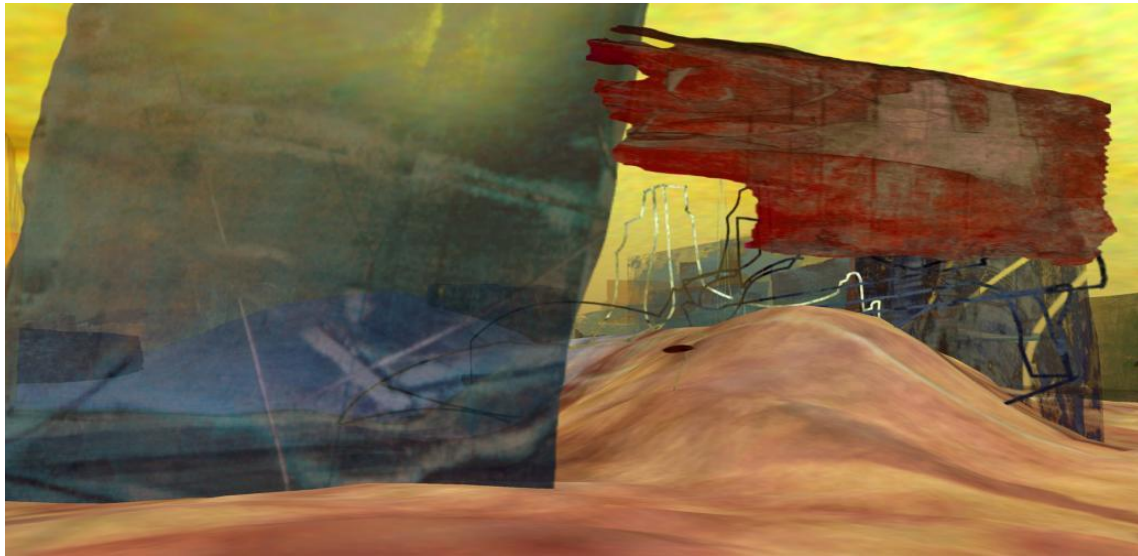


Fig 1. Purbeck Light Years. Still image from digital artwork. Copyright Light Years Projects (2002).

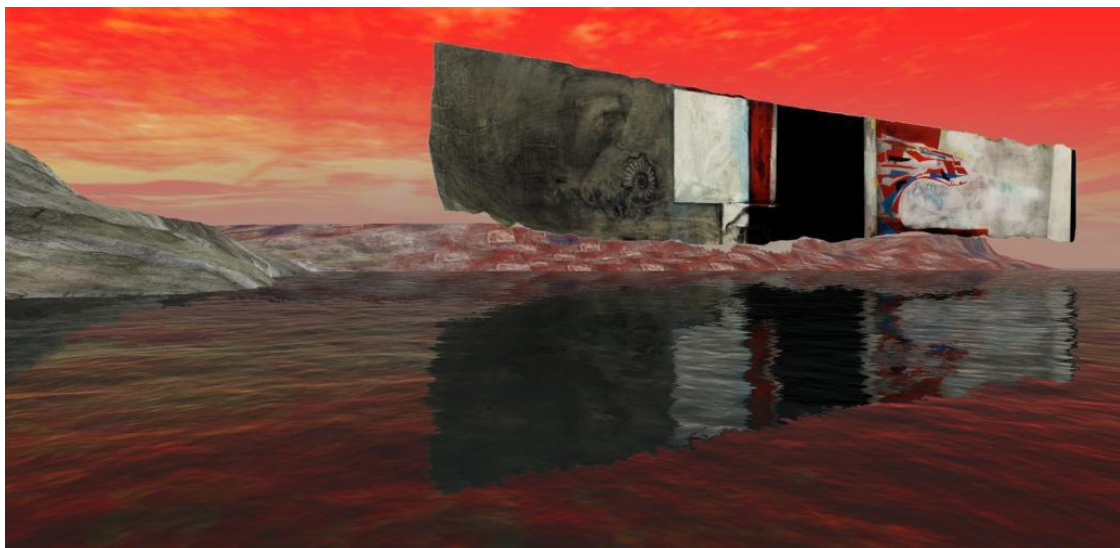


Fig 2. Light Years: Coast. Still image from digital artwork. Copyright Light Years Projects (2010).

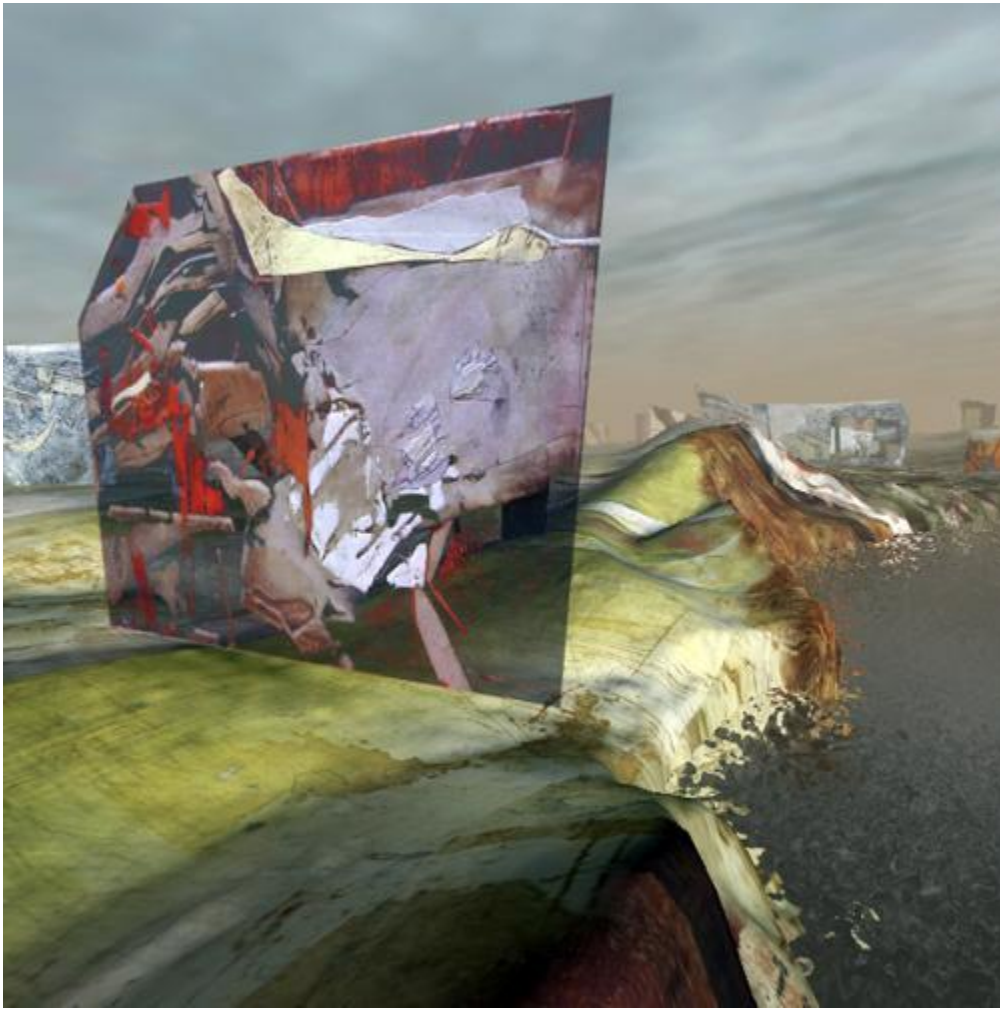


Fig 3. Jurassic Light Years. Still image from digital artwork. Copyright Light Years Projects (2009).

INTRODUCTION

For the last 10 years I have worked in the field of digital landscape painting with Jeremy Gardiner, forming the partnership Light Years Projects (www.lightyearprojects.org). Our work starts with the landscape paintings created by Gardiner, and evolves into virtual digital landscapes, through the addition of my programming. During this time we have explored new techniques alongside the development of technology relating to 3D computer graphics but we have taken care to maintain a painterly approach to our work. The opportunities and limitations provided by technology can sometime lead to tensions and influence decisions that we, as artists make, but that is not always a bad thing. This paper explores our projects in terms of a painterly approach and the role of technology in our work.

A PAINTERLY APPROACH

The term painterly generally has two meanings. The first is related to ‘having the quality of expertly brushed workmanship.’ [1] The second meaning comes from the German word term *malerisch* and relates to the use of juxtaposition of colour and tone, as opposed to the use of line, to create form. Wöfflin in *Principles of Art History*, pointed out that “the outlines and forms of some paintings, such as Rembrandt, are indistinct, and as such the viewer’s eye wanders freely over the painting, giving a sense of movement. [2] In a painterly painting, brush strokes may not represent a life-like reproduction, but a deliberate choice by the artist, where they have consideration of shape, colour, texture, light and expression are all used to provide more than a photographic-like result. The term equally applies to modernist landscape artists such as Paul Nash, whose work overtly interprets the landscape through the eyes, mind and hand of the artist.

The paintings of Jeremy Gardiner reside in the painterly and modernist approach. [3] The abstraction of landscape, through shapes, lines and colour represent many perspectives of the landscape and also seasons, times, and eras. The physical approach to creating the paintings includes impasto, cutting, sanding, painting, rubbing and scoring. These combine to form the experience of the painting, not just as a flat picture, but also as a three-dimensional object.

The opposite of a painterly approach is a linear approach, attributed by Wöfflin to the paintings of Botticelli and Vermeer, paintings where the outlines of objects and people are clearly defined, brush strokes smoothed and (in the case of Vermeer) an attempt to create a realistic-looking image.

So why did we choose the medium of 3D computer graphics that has, for the last 20-30 years, been taking a decidedly linear approach to image making, from pre-rendered animations to real-time computer game graphics? The answer is partly because of the challenge, but particularly because of the opportunity to explore this medium in a different way. We wanted to adopt a painterly approach to 3D computer graphics and to try to avoid the goal of realism.

NON-PHOTOREALISTIC RENDERING

The strand of computer graphics known as non-photorealistic rendering has been achieving a *painterly effect*, a simulation of paint-strokes applied a 3D graphics or video scene, for over a decade ([4][5][6][7] for example). However, this is not what I would describe as being a painterly approach. Computer graphic techniques are becoming more sophisticated in being able to analyse scenes and simulate the application of brush strokes to them. But it is apparent that the emphasis found in the literature is mainly on the technical achievement, and underestimates the intention of any artist in taking a painterly approach. Hays and Essa, in their 2004 paper wrote “a need for non-photorealistic rendering and animation is obvious to anyone who has marveled at artistic works where complex scenes and objects are rendered using pen and brush strokes, using lines, colors, and etches.” [4] In 2008, Bhattacharjee and Narayana wrote “The intentions of an artist come out as the aesthetics and expressiveness of the painting. The accurate rendering done by computers fails to provide images with a such a feeling ... Painterly rendering ... can bring artistic abstraction to the rendering and thus mix the computer generated scenes with the hand drawn elements.” [7] These descriptions, and others, seem to simplify the artistic or painterly approach as being something that is reproducible via algorithmic methods. I would argue that this is not the case. A simplified artistic effect is achievable through these methods, but this is not the same as each stroke being deliberately made as part of the creative process, and each part of the composition being considered (sometimes sub-consciously).

I'm not saying that algorithms can't be used intentionally by an artist, in Algorithmic Art, screen, print and plotter based computer art, artists set up the rules that create the subject and content of the picture. But the above papers, take away the role of the artist in the creation of 'painterly' images, in much the same way as I wouldn't claim to have created a watercolour painting by applying the watercolour filter in Adobe PhotoShop.

LIGHT YEARS PROJECTS PROCESS

In the work of Light Years Project's we have a two-stage process. The first stage is the creation of drawing and paintings by Jeremy Gardiner. Because of this, I have not felt the need or desire to simulate brush strokes in the 3D graphics stage, and instead use scans from the paintings mixed with 3D graphical components and events for the second stage. The intention has been to show the actual paint strokes and textures within the finished digital work, and create an infinitely varied painting and an experience.

We started creating our initial project *Purbeck Light Years*, in 2001. We layered cutouts of scanned paintings within a 3D landscape mesh that had been created from satellite data. The terrain itself was of limited resolution and hence all small features were smoothed out, only the hills showed, including the hill of the focal subject, Corfe Castle. Technology forced our hand on the detail shown on the landscape, but the result was agreeable to us. Gardiner's hand drawn representations of the castle, formed overlapping outlines as the viewer roamed across the landscape. We made deliberate decisions about the positioning and texturing of the line drawings. By observing the results of the interplay of the line planes, we decided upon the outcome that we wanted.

Each of the cutouts from paintings had varying transparency. These planes encircled the line drawn Castle focal point and as the viewer moved, the planes overlapped each other. This enabled the image to be viewed in two ways simultaneously; as the illusion of three dimensions, but also, as a two-dimensional dissected image of shape and colour. We selected a number of planes and positioned them randomly around the castle. We did this partly to convert our aesthetics to a rule based composition and also to enable the piece to be co-creative with the audience (as well as being a co-creative partnership between us, as the artists). [8] The audience was able to interact with the piece to create the compositions that satisfy them aesthetically.

Another aspect of our painterly approach to the project was in capturing the visual essence of being in the location. In Gardiner's paintings, colour and light are used to portray the atmospheric changes brought on by the seasons. These variations appeared in the interactive work; the sky and ground was covered in changing textures that subtly evoke different seasons and weather conditions. The light and colour in the virtual work changed, hinting at day and night. The mist would come in and the sound of rain heard. Other natural sounds (e.g. birdsong, wind, crickets) were also audible, some specifically located in the landscape (co-creative audio composition) and other sounds that occurred at programmed intervals. So in *Purbeck Light Years* we applied a painterly approach to audio media as well as visual media, in terms of composition, blurring one sound into another.

LIMITATIONS OF TECHNOLOGY

Our view when working on this project was to use a painterly approach to many aspects of composition across this virtual landscape. However, there was one aspect of painterliness that we were not able to

portray, due to the limitations of the platform, Macromedia Director, that I used to program the project in, which didn't allow bump mapping or shadowing. We couldn't show the physical texture that the original paint had, and thus revealing the painter's marks, clearly. But also, as we mentioned earlier, we didn't want to create an effect to achieve this either. Once this work was completed in 2002 we exhibited it over a period of five years. [9]

By 2008 technology had moved on and so had our knowledge of 3D graphics, we now chose to use a new platform, Unity Technologies' Unity3D, which allowed bump-mapping and was easier to use for our work. Graphics cards had and still are improving, enabling us to have more detail, larger textures. Processing power had increased allowing for more computational options. We started thinking about a new project where we would be able to take advantage of newer 3D graphics technologies, in hope that it would open up more possibilities in our work. We wanted to maintain our painterly approach. But likewise, we wanted to be more ambitious.

DEVELOPING A NEW PROJECT

Thus we began an eighteen month long development period for our second project. New paintings were created and new programming techniques and ideas were explored. The resulting work has had several permutations since its premiere in March 2009, *Jurassic Light Years* (Chelsea Art Museum, New York, USA, March 2009), *Light Years: Jurassic Coast* (Electronic Visualisation and the Arts Conference, London, July 2009) and *Light Years: Coast* (Lighthouse Centre the Arts, Poole, UK, June 2010).

In terms of ambition, we were keen to expand the scale of the project, increasing the size of the landscape that it deals with, in order to create a larger experience. Whereas *Purbeck Light Years* dealt with a mile radius around Corfe Castle, *Jurassic Light Years* dealt with four miles of coastline and *Light Years: Coast* with fifteen miles of coast. The terrain we used was more detailed, and we were now using two-metre resolution Lidar data to create the landscape, instead of lower resolution satellite data. This meant that rough forms of trees and buildings were visible and could be lit-up and shadowed. These new projects featured the added dimension of English Channel, leading to a quest to explore different ways to represent water. The idea of moving waves and reflections was attractive, as it meant that the reflections distorted the imagery above the water. I used algorithms that fairly realistically mimicked real ocean waves. These waves were connected to an Internet data feed of local weather information. The wave heights and tides were affected directly by the information fed into it, which provided an interesting direct link to the real world.

In *Jurassic Light Years*, I improved the rain system from what I had used in *Purbeck Light Years* by using particles to simulate rain. This gave a more dramatic representation of rain, but too many particles affected the frame rate. Keeping a high frame rate was an important factor in making the experience immersive, as a stuttering image, was uncomfortable to watch. There was considerably more landscape mesh detail as well, and bump mapping on the cutouts of paintings, which showed the texture that appears in paint strokes of the original paintings.

TENSIONS WITH TECHNOLOGY

I spent a lot of time developing these techniques, and this led to a tension. Not so much in what the technology could do, but rather in the result of what it enabled me to do.

As I have mentioned, we had taken on an increasingly ambitious project by representing an experience of a much larger area of landscape. Our painterly concept, of using overlapping planes to create a tension between the 2D and the 3D required approximately 50 planes in *Purbeck Light Years* but to achieve the same density of planes in *Jurassic Light Years*, we would have had to use thousands. Although this was technically possible, it was not artistically feasible. As a result of this issue we ended up with a much sparser landscape in *Jurassic Light Years*.

Light Years: Coast, set in an even larger area of land, had planes that rarely intersected each other, but showed larger sections of paintings, roughly aligning with their viewpoint in the landscape. This meant that the work was part interpreted simulation and part painterly experience. The viewer took a virtual boat ride along the coast, but the visual features were elements of paint suggesting the geology of the land.

Another point about these newer projects is to do with interactivity. They are deliberately passive, less co-creative experiences. This was a decision we made based on audience observation of *Purbeck Light Years*; that many people just stood and watched, instead of using the joystick to interact with the piece. The more passive viewing approach meant that we directed the viewer more. However, this was more akin to being on a boat journey. The co-creative element was reduced and the opportunity to question the two-dimensions versus three-dimensions happened less frequently, but I believe with more anticipation.

Overall *Light Years: Coast* has developed into a virtual landscape experience, where the weather is more clearly defined than in *Purbeck Light Years*, where there is greater contrast between calm and stormy conditions, enhancing the emotional impact.

CONCLUSION

The improving technology, and my own learning on how to harness it through programming methods such as Shader programming, have had a prominent influence on the *Light Years: Coast* work. Technology, or rather the excitement and opportunities of it, *has* affected our painterly approach, by drawing me into wanting to do something bigger (and hence better). The result was, however, different to our original project, it was more 'linear' on the whole. Technology had broadened and challenged our work and also created new possibilities.

The steep technical learning curve I went through has left me with a new knowledge, and control of the medium, that we as Light Years Projects can now apply to new work. By manipulating the language of 3D used in computer games, we can keep true to our original aims of applying a painterly approach to a virtual artwork, to a digital landscape painting. Our next landscape project does not need to be bigger, in terms of the landscape it explores, but will be more focused, and enable us to use the knowledge we have gained of the technology to apply a painterly approach to the work.

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BODY AS A WEAPON AIMED AT YOU

Marta Heberle

The body transformed to data serves as a powerful weapon of the state. It becomes a biocapital, a carrier spreading the disease at the same time entangling itself in the network of politics, medical services, information distribution, transport, databases etc. The war is being fought via biopolitical body, a gun pointed at you.

The functioning of today's state oscillates around the bodies, the population, the life itself. Life is included into the domain of politics, it is an arm of discipline and control, and it drives biopolitics. The currency of biopolitical state is bioinformation. This data is a universally traded commodity. It is of great value to the security state as it allows for the management, supervision regulation and control of population. A valid comparison can be drawn between the attitude expressed towards bioinformation in modern security state and the Marxist notion of "commodity fetish". Different types of bioinformation are extracted, gathered, accumulated and globally exchanged; from various forms of individual identification, all types of health data, health insurance, through consumer information, to the surveillance of bodies in the public space.

However, it should be pointed out that this information is of a very specific character. In the context of contemporary biopolitics, Eugene Thacker observes, that the information of which we're speaking, the main focus of modern biopolitical state is not only immaterial: "Biopolitics mediates between genetics and informatics. (...) In biopolitics (...) information is not exclusively immaterial or disembodied; information in biopolitics is precisely that which can account for the material and embodied and, furthermore, that which can produce the material, the embodied, the biological, the living - <<life itself>>. Information is the point of mediation through which biopolitics regulates genetics and informatics into a sophisticated mode of governmentality and control." [1] So, one might say, that we're dealing with a unique situation in which flesh is made data and data is made flesh. Thacker delivers examples of this duality of bioinformation: "Genome databases, biological<<libraries>> of cell lines, patient databases at hospitals and clinics, prescription databases, insurance databases, online medical services, and a host of other innovations are transforming the understanding of <<life itself>> into the understanding of informatics. (...) The pills, therapies, test results, diagnostic measures, insurance rates and foods are the material output of this informatic view. In rarer cases, cell therapies, in vitro fertilization, genetic screening, and tissue engineering are a literal instances of this biopolitical condition, in which data is made flesh." [2]

Nevertheless, despite the materiality being an intrinsic feature of bioinformation, once the data is extracted from our bodies, in most cases it becomes inorganic and extraneous. It becomes an abstract code with which we're unable to identify anymore. Our bioinformatic patterns evoke a feeling of estrangement and uncanny unease; what once was homogenous and coherent becomes fragmented, translated into numbers or organic samples and processed to the point when we cannot perceive it any other way but as an abject, which gives rise to rejection. We seem to have reached a point, of which Foucault was speaking in the context of utopian body: "Utopia is a place outside all places where I will have a body without a body." [3] It's not the case that our moist intestines have dried to bytes. Their materiality exists, but as they become incorporated in the intertwining networks of medical services, economy, politics, culture, media and third-party companies, they become owned. Whether in a material or immaterial form, they are absorbed by interlaced networks and then exchanged, circulated and

distributed. In the constant fluid flow of biological exchange, different subjects, different power vectors, appropriate the value of biological information, be they hospitals, pharmaceutical companies, security services, government agencies, independent individuals etc. In biological exchange, this networked, mobile bioinformation is both the input and the product.

Yet since it was directly stated that in the constant process of bioexchange, bioinformation becomes appropriated, fundamental questions remain to linger: Do we own our bodies at all? Do we have the right to trade them, to sell the bioinformation derived from them? Why does my body exist more in the banks, databases than it exists for me? Why has my essential data been converted into commodity and why do influential companies, pharmaceutical moguls, ruling elites, security services freely use and trade it without even bothering to ask for my consent? How is it possible that once it has been extracted from me I am unaware of what my samples are used for and unable to decide about them, although they are my very property? Perhaps we should raise these objections at the level, where biodata is being collected, before it's incorporated into the circulation of the global networks.

Consciousness of ways of gathering bioinformation is of great importance. For are we aware that our every step, every credit card transaction, every email are watched, tracked, filtered and thrown into the fluid information networks? One of the "terminals" that constantly monitors the activity of biopolitical bodies in public spaces turning it into data, are surveillance cameras. They're almost everywhere; the ruthless gaze watches the streets, workplaces, means of public transport, offices, institutions, parks etc. Unfortunately, there are little chances of avoiding their omnipresent eyes. Since they cannot be eluded, they become naturalized and grow into the city's landscape, at the same time abolishing the uneasy feeling of being watched and also, our alertness. Another restrictive branch commonly utilized by security services are biometrics. These are technologies, which allow for the recognition and identification of humans upon their measurable physical or behavioural features. As Emilio Mordini and Sonia Massari indicate: "Current biometrics include fingerprints, ultrasound fingerprinting, iris scans, hand geometry, facial recognition, ear shape, signature dynamics, voice recognition, computer keystroke dynamics, skin patterns, foot dynamics. Future biometrics (second generation biometrics) include neural wave analysis, skin luminescence, remote iris scan, advanced facial recognition, body odour, and so on (...) Also behavioral biometrics – which measure behavioral characteristics such as signature, voice, keystroke pattern and gait – is becoming increasingly important." [4] These systems are becoming commonly used, consequently every time we cross a border, undergo a routine medical check up, visit a bank, or even try to enter a public institution, our intrinsic, innate characteristics are being gathered and included in a database as well as in a global stream of interconnected networks. This biodata may serve commercial institutions, pharmaceutical companies, statistical bureau, and passport control services at the airport just to name a few. They prove useful in cases of profiling people, they may decide upon inclusion or exclusion facilitate human segregation alike eugenics, reveal weak points in human constitution thus delivering instructions where to strike to crash our bare systems or even providing formulas for creating a bioweapon capable of exterminating particular ethnical groups due to their slight DNA differences.

What has to be necessarily highlighted is that these biometrical technologies don't only gather one type of information at a time, relevant for the identification of biocitizens. To use a simple example, when a person is having his or her iris scan taken, additional data such as eye colour, the complexion, which may give some hints as to the ethnic origin, and other signs revealing for instance certain health problems are being collected. Then this data is dispersed and perhaps it doesn't serve only the purpose it was primarily destined for. Situations of this kind are spoken of in terms of "function creep". "Function creep" is the term used to describe the expansion of a process or system, where data collected for one specific purpose is subsequently used for another unintended or unauthorized purpose" [5] This feature cannot

be expelled though, as it is a result of the ways biometrical systems operate and also a characteristic of our fleshy envelopes.

What Mordini and Massari also observe is that article 7 of the EU Data Protection Directive firmly states, “No data collection can go unnoticed by the subject that is being monitored. The goal is that the individual is aware of all types of data about him/her that are collected.” [6] Perhaps this could be a solution to the oppression and terror experienced in almost any dimension of life by biopolitical bodies if it wasn’t for the second part of this article which abolishes binding force of the first paragraph predicating, that it is not applied in cases of ‘processing of data relating to offences, criminal convictions or security measures.’ [7] The law collapses into itself.

Where state reenacts the spectacle of evil, biopolitical bodies choose to accept the ever increasing strengthening of defenses, regulations, as well as terror and hysteria that accompanies them, supporting the conviction that it’s all being done for their protection and safety. Roberto Esposito, in his analysis of the thought on immunization brought by Niklas Luhmann underlines, that “systems function not by rejecting conflicts, but by producing them as necessary antigens for reactivating their own antibodies.” [8] The metaphor of vaccination seems exceptionally accurate when applied to the mechanisms that constitute the roots of security state. Humans intoxicate themselves with a substance which is in a relation with the disease and which may procure some of its symptoms claiming, that this treatment increases their chances to last. But is it vital that we accept and, what is even worse, rationalise this violation, constraint and terror? Are we truly condemned to this destructive constellation of power?

As I have emphasized earlier, the consciousness of mechanisms driving security, or shall we rather say terror state, is of crucial importance, and to some extent it may help to limit the participation of biobodies in the superiorly induced social hysteria. If we remain unaware of these processes, and, what’s even more important, if we don’t realize the position in which we are put, we become pawns in the game. What’s especially important is to simply think for ourselves instead of commissioning this task to the power. Otherwise, choosing ignorance and randomly accepting the arguments delivered by the authorities, we, our biodata, will become a commodity sucked into, and traded via a global network as we perform simple routine activities of everyday life.

Slavoj Žižek suggests that “The problem is not terror as such - our task today is precisely to reinvent emancipatory terror.” [9] Assuming that emancipation is the action of freeing oneself from restraint, I understand this thought as an expression of a necessity of a quest for smart ways enabling biocitizens to limit the destructive impact of security state functioning. But what exactly could these ways be in practice? Firstly I would like to underline what I have stated above, that consciousness is the key stage in directing the guns aimed at biopolitical bodies the other way. It’s a weapon, and, to some extent, also a remedy. To give a simple example: in an outbreak of influenza caused by a new, not thoroughly recognized mutation of a virus, one may refuse to “protect” himself with a vaccination from a questionable source, prepared quickly by some influential pharmaceutical mogul, as an answer for the threat to the body politic, thus eluding the participation in the mass societal panic. On the other hand, there are also other, more radical and drastic possibilities of intervening in the mechanisms of security state, such as adopting its own methods, which, in this case means responding to terror with terror. However, the most common reaction - traditional attacks, be they plane kidnappings, booby-traps or assassinations of people from the pedestal of power, hardly ever prove successful and reach the goal of terrorism which is, as we know, not the military victory, but a change in sociopolitical structures. At the same time, it has to be acknowledged that such operations may easily turn against their originators. As Chomsky says:

“React with extreme violence and expect to escalate the cycle of violence, leading to still further atrocities, such as that is inciting the call for revenge.” [10] Thus, it has to be remembered that, to paraphrase Jack Parsons “Terror is a two edged sword”.

It’s particularly for this reason that I see a great potential in utilizing bioweapons for the purpose of counterterrorism, understood here as reacting to the oppressive actions undertaken by state. Although it’s a common persuasion, expressed by great number of experts dealing with the subject of bioterrorism, that bioweapons are completely useless, I find it hard to agree with this perspective. Steve Kurz, in his profound study on the possibilities of bioterrorism, underestimates the effectiveness of bioweapons directly stating that “biological weapons are only what they are—useless junk.” [11] However, I attribute the attitude expressed by Kurz to the fact that he focuses mainly on old, exhaustively researched viruses and bacteria and also examines bioterrorism in terms of military victory and statistics of casualties, not in the symbolic sense. In my opinion, in the conditions of easy accessibility of biodata gathered in databases (for instance open databases facilitated by academic environments or individual scientists), possibilities of intercepting information exchanged in various networks, and a great amount of know-how available at every terminal capable of connecting with the Internet, the chances of producing a new, unknown, transgenic supravirus able to decimate populations, are very high. After all, benefiting from the databases is nothing but getting our biodata back. “In the future, terrorists will be individuals or like-minded people working in very small groups, on the pattern of the technology-hating Unabomber, who apparently worked alone sending out parcel bombs over two decades, or the perpetrators of the 1995 bombing of the federal building in Oklahoma. An individual may possess the technical competence to steal, buy, or manufacture the weapons he or she needs for a terrorist purpose; he or she may or may not require help from one or two others in delivering these weapons to the designated target. The ideologies such individuals and mini-groups espouse are likely to be even more aberrant than those of larger groups. And terrorists working alone or in very small groups will be more difficult to detect unless they make a major mistake or are discovered by accident.” [12] Taking into account the context of bioterror, I fully agree with Laquer’s opinion, especially on the easy accessibility of materials needed for a terrorist attack and the possibility of operating alone, yet for me, the future is now. It is precisely now that biocitizens may produce subtle, invisible, odourless, undetectable lethal microbes. It is now that they may use their bodies as incubators for viral replication and as carriers spreading the disease at the same time. The disease may be distributed easily and at a great speed through many channels, as a matter of fact, through all places of human flow like transport network, shopping malls, public institutions, schools, workplaces etc. The infection may also occur on a global scale. The only condition is to create yet unknown, unfathomable organism precluding the attacked side from defending. The surprise itself works here as a weapon.

Another option of addressing the issue of unjust practices of security state is interpreting them through the domain of art. Artists may strike various attitudes and one of the commonly used to engage in a critical judgment is “parasitical” feeding upon found sociopolitical structures in order to subvert them and blow their foundations up from the inside. Interesting examples are delivered by Institute for Applied Autonomy in the project *iSee*, which is a web-based application enabling users to move freely around the city space avoiding the gaze of CCTV cameras, by BIOTEKNICA collective, whose interventionist art project raises the issue of commodification of live and of generating and trading organisms on demand, or the *Molecular Invasion* by Critical Art Ensemble, which takes up the form of scientific theatre of participation intended to reverse the process of genetic modification of groceries through experiments with non-toxic, widely available substances.

These are only few examples among a great number of artworks devoted to the issues of various implications of the mechanisms, which drive security state. Unfortunately, the scope of this publication is too limited to elaborate on this point. However, I would like to point to the fact that such artworks not only function in the domain of art, but also effectively intervene in the social order. They make open what was obscured, they uncover what was meant to remain secret and exclusive, thus abolishing the hierarchy present in security state, and moreover, they deliver practical methods of opposing detrimental methods. Since works as such don't confine to the aestheticization of life, rather overcome the distinction between the two dimensions and cause factual changes in the hyperreality of security state, then, perhaps, avant-garde hasn't, as some art critics have claimed, suffered defeat, but right now is at its triumphant position.

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THE ART OF LIVING SYSTEMS

Marta Heberle

The notion of life is difficult to define, thus one, universally adopted definition simply doesn't exist. Where does life start? Is it on the level of cells, tissues, the organism? Where can we draw a line separating that what's living from the dead matter? In my paper I would like to reflect upon a group of artworks which literally utilize ephemeral cases of life.

Definition of life is blurred by its nature [1]

The notion of life is difficult to define, thus one, universally adopted definition simply doesn't exist. However, it may be assumed that the most important characteristic of life is a constant exchange of matter and energy between living organism and its environment and the ability to replicate or reproduce. Such dim explanations, questioning the ability of creating one homogenous answer to what exactly the term "life" means, are delivered by many popular encyclopaedias as well as scientific publications. The basic feature of life mentioned by those definitions, also doesn't entirely solve this highly problematic issue. For, is it possible to speak of life in the case of cultured tissue, in the same way as we speak of a living organism from which it was extracted? Where does life start? Is it on the level of cells, tissues, the organism? Where can we draw a line separating that what's living from the dead matter? There are many different definitions of life, which perceive this compound phenomenon from different angles, which take into the account its various aspects. Among many, we can mention reductionist definition, thermodynamic definition, cybernetic one, or a definition founded on the life functions of organisms. The answer to the question whether a given phenomenon can be perceived in the category of life, depends in prevailing degree on the definition we adopt, as well as on the arbitrary decision of a person reflecting on this subject. This ambiguity and indeterminacy of methods we use to research this matter are problematic and raises doubts, whereas crucial decisions often have to be made by means of precedent. Where paralogy is the best methodology available, questions still remain to linger: on what level of cell/ tissue complexity can we speak of life? What do we perceive as an entity? Can life be reduced to numbers, codes, or algorithms? Having these issues in mind, I would like to reflect upon a group of chosen art works, which literally utilize ephemeral cases of life.

For the art works into which I will take a deeper insight, I proposed a term "the art of living systems" serving as a common denominator. These artistic projects focus on particularly problematic cases of life, on the life that is liminal, ephemeral and eludes definition.

A-vo/ve is an installation created by Christa Sommerer and Laurent Mignonneau, which enables the generation of artificial ecosystem inhabited by creatures which are forms of artificial life. Users design their 3D beings which cohabit the simulated environment, by means of defining their shape and look via a touch screen. Then their image is being projected onto a mirror placed in the bottom of a water-filled pool. The artificial habitat is ruled by the brutal principle that the strongest will survive. Artificial creatures manifest activities characteristic for those observed in the animal kingdom; they compete with each other trying to accumulate as much energy as possible. The predators kill the weaker and take over their energy. The creatures, which survive for a long time, are capable of reproduction and their offspring's carry their genetic code.

The notion of artificial life (*A-life*), was first introduced by Christopher Langton during the conference in Santa Fe in 1988. "It is the name given to a new discipline that studies "natural" life by attempting to recreate biological phenomena from scratch within computers and other "artificial" media. *A-life* complements the traditional analytic approach of traditional biology with a synthetic approach in which, rather than studying biological phenomena by taking apart living organisms to see how they work, one attempts to put together systems that behave like living organisms." [2] In this extension of the empirical foundations of biology beyond the carbon chains of earth-based organisms, artificial life can contribute to the theoretical biology by situating life as we know it in the broader context of life as it might be." [3]

The substantial value of *A-volve* is blurring the line, which separates the two worlds, the real, and the artificial one. It is achieved mostly through the interference of interactors into the artificial ecosystem and also through the fact of reconstructing the natural laws in artificial ecosystem. The authors suggest, that "the visitor becomes a part of the evolution system, a partner to virtual organisms, he gives and promotes «artificial life»." [4] Although the above-mentioned definition gives an answer as to what artificial life is, some doubts are raised as to its very nature. Is artificial life only a simulation of the real one? Is it a reconstruction of thoroughly investigated properties of life? Or maybe it is, in a sense, and independent creation that not only imitates certain pattern but also at some point escapes control and governs itself with its own laws? We may ask: is there in artificial life actually anything that we, in common terms understand as living? This notion itself is an antithesis. Lou Bec states, that "artificial life is only a construct that accommodates a tensorial space." [5] The words "construct" reminds us of the fact, that *a-life* is only a creation that exists upon a certain agreement. And although in the case of *A-volve* we are dealing with behaviours and processes similar to those occurring in real life, it is yet only a similarity, whereas the life lived by the creatures is only...artificial.

Carnivorous Domestic Entertainment Robots is a project, which consists of a number of works, which, being themselves artificial forms life, make use of the life of other organisms. The artwork created by James Auger, Jimmy Loizeau and Aleksandar Zivanovic, is a series of carnivorous robots, which manifest similarity to exclusive furniture or luxurious objects of everyday use. Yet, they're not as nice as they appear. In fact, by the use of microbial fuel cell, they imitate the strategies of predatory insects, reptiles and plants. Some of the dangerous devices were created upon the rule of mimicry. For instance the *Lampshade robot* is a lampshade whose form is similar to that of a carnivorous plant. Through the holes in its spherical construction, a light, which attracts insects, is being emitted. Once the insect falls onto the other side of porous surface, its unable to free itself. The treacherous ambush makes use of its death, transforming it into the energy which fuels led lamps at the bottom of the lampshade.

The functioning of carnivorous robots may be described as a recycling of life. For they use the existence of small, fragile and short-lasting creatures that would sooner or later be destroyed anyway, such as moths attracted to light. The architecture of the devices as well as the use of microbial fuel cell solve the issue of the corpses of little animals, which die unable to escape from our houses. Silent murders committed by the machines give rise to a peculiar chain of alimentary dependences in which the robots feed upon real life that becomes their driving force. In this merciless system, the biological life is literally transformed into energy, which then is used to support some simple mechanism. At the same time an important fact is being brought up; that the energy is pulsating in every living organism and that there is also a possibility of extracting it.

On one hand, we may assume, that the technology subjected in this artwork to biologization offers the subjects that are caught in the deadly trap a kind of afterlife, or the extension of life. The time of light

emission of a little led lamp, most probably exceeds the length of their existence. The death of little organisms is in a specific way productive, thus we can think of it as of a sacrifice of real life for the behalf of the artificial. However on the other hand this project places its audience, or the owners who decide to buy such utensils in an uncomfortable position, making them the viewers of a brutal show. Carnivorous, cruel *biobots* take away the right of living organisms to natural death, literally extracting the energy from them. This work raises questions as to whether such life recycling, and instrumental approach towards it, not only for utility purposes but also for entertainment is moral? Is there any justification to dispassionate observation of a transformation of life resembling the position of audience during bloody fights of the gladiators?

Another artwork focuses on a highly controversial and problematic issue - the *semi* life. It explores the issue of semi life thoroughly, which results in art projects founded upon tissue cultures. Oron Catts and Ionat Zurr, artists cooperating with the centre for research as a *Tissue Culture & Art Project (TC&A)*, proposed a series of artworks under the name *Victimless Utopia*. In my paper I would like to focus on one of them, entitled *Disembodied Cuisine*.

The authors decided to deal with the hypocrisy surrounding the discourse of ethical food, which allegedly causes no victims. For this purpose the gallery space has been transformed into a laboratory. Inside it, extracted muscle cells of frogs were turned into half- living sculptures, destined for consumption purposes. The animals that were the cell donors weren't harmed in the experiment. The material collected from them via biopsy was placed onto biodegradable polymer construction and placed in a bioreactor. Then, the tissue cultures were „growing“ in the conditions resembling those of the donor's body. The project culminated in a ritual feast, during which the visitors consumed the cultivated steaks, at the same time killing half-living entities.

Tissue is generally described as a collection of similar, organised cells, which perform a definite function, whereas tissue culture is a technique, which consists in isolating little fragments of tissue from the body and cultivating it in a dish containing appropriate nutritious substances. While the body is unable to do without organs and tissues, they can fairly well do without it at the same time fulfilling their specific function. Catts and Zurr suggest that it is a new type of living, thus it needs a new ontology and new taxonomy of life. [6] It is then a sort of a part life, a kind of half- living entities. „When cells and tissues are removed from the context of the body and kept alive, they are also stripped of many aspects characteristic of what is assumed to be a living entity. They are kept alive and raised in a technological environment, which serves as a surrogate of the body. But in the very basic sense they represent the bare life.“ [7] Then what precisely are those half-living entities? How should they be perceived? What is the point at which we can speak of life? Can the level between the cell and an organism be described as life? The tissues extracted from the body are situated between that what is living and that what is devoid of life, they are new entities, liminal, ephemeral and undefined, and they completely elude both the biological and cultural classifications. The notions defining body as a whole are inadequate to speak of these phenomena. If we try to describe them in traditional terms, then we will come to a conclusion that they are neither alive nor dead.

The works I would like to turn to next, are similar to *Disembodied Cuisine* in the aim of creating a system providing incubatory conditions, which would protect life and ensure its development. Whereas in the former project the simulation of natural conditions prevailing in the organisms of donors was only one of the conditions necessary to maintain fragile entities alive, creating a biological habitat, a system in which life is possible determines the direction of artistic research of Zbigniew Oksiuta. Their final goal is, as the artist claims, the creation of „autonomous, biological, self-replicating system for one person. Such

system could be the size of a cell, a pill, a fruit a house, or even a biosphere. It could also exist in different environment: on earth, underwater and in the outer space.” [8] The project on which Oksiuta was working between 2003-2007, entitled *Space Garden*, was supposed to create a see-through polymer bubble filled with air in cosmos. Inside this isolated biosphere, a garden would bloom. On Earth there are prototypes of Space Garden simulating the parameters and the evolution of this process. They are appropriately miniaturised and they use a klinostat – a tool used for the research of the force of gravity on the growth of plants. Another project, *Plasmalema*, was an attempt of creating a habitat, which would provide conditions allowing humans to live underwater. This work, as most in Oksiuta’s output has a shape of a transparent bubble. It was made with the use of *Spatium Gellatum* method, which enables the creation of space structures from biological polymers : soft, permeable membranes, that at the same time protect the life inside. The space enclosed by this elastic cover was filled with *perfluorocarbon*, a substance allowing humans to breathe underwater with liquid.

The peculiar works of Oksiuta remind independent planets on which, or maybe it should be said, inside which – a life exists. They resemble a separate world, functioning on its own rules. A world that is autonomous and closed, as if in a crystal ball. They inspire to reflect upon questions such as where else and on what scale can life exist. The artist declares that for him the most important thing is the ability of living systems to self-organize, thus he tries, on the rule of analogy, utilize this rule in his projects. Those, and other artworks of Zbigniew Okasiuta, which explore the subject of biological habitat, raise several questions regarding life, for instance: how and where can it exist? The spherical micro worlds are like small, safe rooms, incubators, which export life into inaccessible, dangerous or potentially lethal territories. Bringing the life space of organisms to a tiny sphere can be also seen in terms of looking for an answer to ever pervasive questions: on what scale can life exist, can it function as an isolated, self-sufficient sector. We should also reflect upon the question what kind of life could inhabit the miniaturised ecosystem compounded by the artist. Although the transfer of a human being into such conditions, given the account of its complexity, seems completely impossible for now, the hermetic systems can serve as a living space for autotrophic plants and also tiny organisms such as bacteria. Sometimes, the bubble space structure itself is also being described as living thing. It undergoes transformations and reacts to stimuli from the outside. Perceiving a frozen, motionless architectural object, whose activity is not fully noticeable and clear, as living, seems like not particularly adequate and accurate. But I have no doubts that the works aiming to create a *Biological habitat* can equally well be called systems for life.

The last art project, at which I would like to look closely, focuses on displaying one aspect of human life, one of the indications of human physiology. There are some circumstances, upon which this project can be compared to the living sculptures of Oksiuta. For both *Cloaca* created by Wim Delvoye, of which I want to talk about and the works of polish artist conduct an experiment, which consists in the idea of transforming the natural scale of phenomena and exporting it outside its natural context. The project of controversial, Belgian artist is a synthetic digestive system extracted from the primary source of the body and shown in a multiple enlargement. The scandalous installation simulates one of the processes occurring in the insides of the living organism, and in a sense it refers to the famous Vaucanson mechanical duck, which was an attempt of creating an equivalent of digestive system. The contemporary *Cloaca*, synchronized with technology, simulates the activity of human digestive system with great precision. Artificial organs perform different functions. There is the oral part, the stomach, and the anus. Into the artificial organs, acids and enzymes are being introduced, enabling the digestion of food. Whereas the human organism aims to fulfil the need of supplying the nutrients to survive, the only aim of *Cloaca* is the production of excrements, the waste products of metabolism. Some specimens resemble a row of containers, while others look like washing machines connected with a net of cables and tubes. Although the machines simulate transformations occurring in the fleshy, moist human body, they do not resemble

human being at all. „The shocking thing is that it doesn't look like a human being. The shocking thing is that it's like a wheel. The wheel isn't trying to look like your feet, but it does the same thing as all feet do. [...] It's a robot in a way, but it's not trying to look like the gastrointestinal system. It's not trying to be anthropomorphic. It doesn't try to look like a human being. It's a live thing...” [9] But do containers, tubes and filters connected into a whole imitating human digestive system in any way remind the living entity? The metal parts, despite the ability to produce substances universal for human beings, seem to be devoid of life. Yet the author of this peculiar installation arrives with an important argument: „Once the machine is installed in a museum, it is a live thing. Even when the museum is closed the machine is fed everyday, because in the organs, there is real human stomach bacteria.” [10] It is then precisely the system of different bacteria enabling the decomposition of nutrients that is alive. The regular feeding of the machine equals supporting the ephemeral life of weak strains of beneficial bacteria.

The *Cloaca*, like every living thing, is sometimes capricious when it comes to some kinds of food. In contrast to the Vaucanson duck, it not only simulates the functioning of digestive system, but it also precisely simulates digestive processes, making their final product almost impossible to distinguish from the one produced by the human organism.

The substantial issue in the context of this installation is also the biologization of technology; what in normal conditions is being performed by the moist machinery of the organism, can be equally well conducted outside the context of the body by a cold metal mechanism. The aspect of care, which is manifested in the need of feeding the *Cloaca* regularly, as well as the impossibility of turning the power supply off the reminds us of the fact that we're dealing with a living system, or rather a biological system of bacteria strains, which support the artificial system.

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THE DISTURBED DIALECTIC OF LITERARY CRITICISM

DAVIN HECKMAN

This paper discusses the relevance of database projects like the Electronic Literature Directory. It is a call for criticism that is technologically appropriate, ethically engaged, and culturally vital.

In *The Phenomenology of Spirit*, Hegel describes the dialectical process:

"The bud disappears in the bursting-forth of the blossom, and one might say the former is refuted by the latter; similarly, when the fruit appears, the blossom is shown up in its turn as a false manifestation of the plant, and the fruit now emerges as the truth of it instead. These forms are not just distinguished from one another, they also supplant one another as mutually incompatible. Yet at the same time their fluid nature makes them moments of an organic unity in which they not only do not conflict, but in which each is as necessary as the other; and this mutual necessity alone constitutes the life of the whole." [1]

Viewed from within the Hegelian process, the Real is positioned outside its present manifestations, consisting, rather, of the dynamic processes that comprise its totality.

This insight, crucial to critical practice, requires revision in light of technical change. By revision, I do not mean that we need to fundamentally alter Hegel's argument, I only mean to suggest that we see this passage with respect to new temporal modalities that have shaken up the pursuit of knowledge.

The field of Electronic Literature is characteristically engaged with this disturbance in the dialectic. A casual glance will reveal that there are many significant developments in the field that, had they happened over a longer timeline, would likely be much easier to sort out. Take, for instance, the body of works known as "Hypertext fiction," which represent the closest thing Electronic Literature has to a sustained, stable format. If we track literary hypertext along the history of Eastgate Systems, we are looking at an aspect of the field of electronic literature that dates back to the company's founding in 1982 (though Eastgate's first literary hypertext, Michael Joyce's *afternoon, a story*, was first published in 1987). If we broaden our definition to include interactive fiction and text-based computer gaming, we can push the timeline back to 1975, with the creation of *Adventure*. Beyond this, we can trace the form back to the "Hypertext Editing System" by Ted Nelson and Andries van Dam in 1968. In any case, the history of this particular literary form is a half-century old at its most generous estimation, but it really isn't until Eastgate Systems emerges as the first commercial publisher of Hypertext as Literature, that we see a committed effort to the literary exploration of a particular form, with the bulk of their offerings published in the 1990s. If we add web-based Hypertext fiction to this timeline, that would add to the overall number of works available, but it would still distribute the bulk of creative output over two decades, and would place a massive technical innovation smack in the middle of this arc. [2]

To put this in perspective, one might juxtapose this to the history of the novel which, even at its most conservative definition, spans three centuries. If we want to consider a genre, say, the Gothic: Over 70 years pass between the publication of Horace Walpole's mess of a book, *The Castle of Otranto* (1764) and Edgar Allen Poe's elegant perfection of the gothic in "The Fall of the House of Usher" (1839). Though Franco Moretti has made a convincing case for a more compressed periodization of generic eruptions,

my contention is that this cyclical activity is evidence of the grand dialectical process within which durable forms achieve their refinement, a point which does not conflict with Moretti's model. [3] In other words, historically, the time of literature has been slow and staggered. The kind of back and forth between the creator of a work and its critical reception, followed by a modified approach, and yet more criticism, has simply been short-circuited by the rate of change.

To frame my argument within a more contemporary point of reference, Alain Badiou's notion of "the set" consists of the range of knowledge and the logical potentiality framed within its structure. A "truth" is that which exceeds the bounded structure. This point of rupture is perceived as an "event." [4] If we consider the set and its redefinition by truth as marked by an event, we can rethink what Hegel aims to describe without becoming mired in chronology or bound to fatalism.

We can imagine a horizontal vision of this dialectic, that steps beyond the sequential process of thesis, antithesis, synthesis that seems to favor the vertical progress of the historical from its zero point towards the future. In other words, I mean to ask, can the dialectic as developed by Hegel be applied to a context of simultaneity? Certainly, this seems possible if the organic unity imagined is that of the interpersonal dialog as opposed to long process of "progress." Foucault's heterotopia emerges as a particularly promising instance of a momentary instance of the dialectic in action. Here, truth is located interpersonally, held into place through the negotiations of language, in which the minute turns of the conversation shift meaning over from incomprehensibility to the furtive, contingent moments of communication. To answer my question, we can view the dialectic as a set when it reaches a point of singularity, where an event brings about a social and individual shift in consciousness. The closest we can come to simultaneity in this process is only when it functions systematically, as a set whose rules can be articulated within the defined constraints of its domain.

Ultimately, does it matter from an ontological perspective that the domain of discourse occurs within the boundaries of a long arc of historical time or an abbreviated one? Is the issue the interval within which the system processes information or is the issue the means by which systems process information? To reflect on the effects of processing speed, imagine the game of *Risk*. Played on a board with dice, it is a game that can easily last several hours. Players roll dice, argue with one another, take trips to the restroom, but the objective of the game itself is always to conquer the world. Early electronic versions of the game significantly sped up key aspects of play, most notably the rate at which combat is resolved, dead pieces are removed from play, and cards are cashed in for more pieces. Also, cheating and error are significantly more difficult in this iteration of the game. As processors speed up, these actions speed up significantly, such that an old digital version of *Risk* can run at speeds that exceed perception. And, with face-to-face interaction limited by the interface, table talk is further limited. Yet, the basic objective remains essentially the same: take over the world. Viewed from this perspective, the basic rules of the game of *Risk* and the objectives of play remain more or less the same, but on the computer, the five hour board game can easily be played in an hour. And, if you play against a computerized opponent, this play time can be compressed even further. Within this framework of interactions, speed itself makes no alteration to the game whatsoever, unless, of course, a key feature of the game is the relationship of the human player to the game as a discrete domain of interaction, an object consisting of many little pieces that follow many rules in pursuit of a particular end. With speed it is possible to care less about the game, to suffer the loss of the illusion of the game's relevance, to weaken the immersion, and to eventually erase its pleasure.

Thus, I argue, that to understand the meaning of any process, the projection of a hypothetical subjective externality to the system matters (In other words, subjectivity produces criticism and is produced by

it). The dialectical view is less a progression through sequentially interrelated phenomena, than it is a commitment to a critical relationship to systems regardless of their interval. Just as one can easily perceive the vast difference between distinct iterations of the same game whose rules and objectives remain the same, one can affirm that the human subject itself can always potentially exist as the site of the critical encounter, when one directs consciousness to seek the most subtle relative differentials between the representations. The dialectical process is a simplification of this basic process of consciousness, and we map it onto illustrations that are obviously sequential, but the critical capacity could easily be mapped onto more subtle sequentialities, networked causes, distributed effects, and nearly simultaneous interactivity. What is needed is not a new critical faculty, but critical tools and techniques which can effectively account for differentials that occur beyond the limits of our perception. We must acquire telephoto lenses, wide angle views, slow motion techniques, freeze frames, and other ways to comprehend fast interactions, wide sweeps of behavior, gentle modulations of thought and action.

But, at the same time as we deploy new tools and methods, we must not mistake these tools and methods for subjects themselves, for the basic goal remains the same: to know what it is that is happening when something happens. The critical faculty itself, while significantly altered in its form by the new terrain, cannot be altered in its function without ceasing to be criticism. In other words, against the backdrop of material and cultural changes (both microscopic changes to the object of criticism and macroscopic changes to the system within which objects are situated), we must begin first by imagining the very potential of the truth procedure itself, the hypothetical perception of rupture. For, though we are always first situated within a milieu which seems to define itself through the consistencies of its domain, we also know that it is this very situated character of subjectivity that desires to be otherwise and elsewhere, whether we seek to be a few inches over or a few seconds sooner or later, we have motive to move, to form, to alter, to explore. This very kindling of desire is what removes us from the present moment and places us into the slipstream of historical and speculative thinking, of memory and anticipation, is the selfsame capacity that at the more abstract level enables us to imagine sudden tectonic shifts or to witness glacial changes. Those revolutions of thought which alter the very ground rules that frame what we see begin as critical stances, as hypothetical alternate subject positions that challenge the ones that we presently occupy. Criticism must begin with a commitment to what it is: A position, enmeshed in the social web, but never simply constituted by it. To put it more bluntly, criticism might be the decision to be something more than nothing, to step out of epiphenomenal existence, to struggle against instrumentality.

While poststructuralism has rendered it difficult for subjects to imagine discrete, defined roles in discursive projects, the projection of such roles is necessary if we wish to engage in critical practices. This is not to pronounce that I am a “critic,” and therefore will cease to be a “reader” or “writer.” Rather, it is to say that in a time when crowd-sourced approaches, fan-based scholarship, and the general spirit of open access have revealed the critical value of readerly practices, we must then accept the notion that alterations to these practices matter. At a time when networks, technology, and participatory media trends have likewise removed the critical barriers to aesthetic expression, we must accept the notion that writing has also been fundamentally altered. Rather than permit criticism to be subsumed into expressive and interpretive practices, the task before the critic is to imagine criticism that can identify in these shifts a fundamental change in the relationship between reader and writer via text. We learn nothing beyond what we already know if we overlook the systemic relation between writer-text-reader (or producer-commodity-consumer, programmer-software-user, architect-building-occupant, teller-story-listener, or really any mediated relationship).

To truly apprehend the nature of the dialectic of reader and writer held together by the thread of the text, there must be a clearly delineated third position, that which is neither reader nor writer, though one might at times be one, both, or neither. Rather than define the critic as a special class of person, it is better to identify the critical faculty as a distinctive subject position, a way of viewing the text and how it functions socially as a nexus of interaction between readers and writers.

The problem of speed, though it upends the vertical progression of past regimes of production and reception, is not in itself a problem for criticism. There are still readers and there are still writers and they still interact through the text. The difference is that these particular subject positions are not so easily isolated, not easily localized on a particular historical individual or archival document. We don't necessarily need a stable sustained form like the novel or the Gothic to understand the significance of Electronic Literature more deeply (though such consistencies, where they are perceptible, provide excellent case studies), what we need is a critical exploration of the plane of consistency itself (in this case, it is that of technological change and social adaptation). What Derrida did for words, we must do for the interface, the platform, the logic of new media itself. But we cannot simply argue against the aura of stability associated with words, we must turn to the aura of currency, of the presumed veracity of change, of the upgrade, of the improvement, of the debugged. The promise of newness is that which we have come to trust. A rigorous discussion of this trajectory is among the most pressing critical projects facing us today: What are the poetics of innovation? How does it function grammatically? How does the poet play with this language? What are the social, ethical, philosophical implications of this presumed foundation of cultural existence. Whereas past critics may have had the time and luxury to mistake their acts of reading or writing with criticism, losing sight of the function of the text within culture, we have the luxury of living at a time when we are seeing a radical shift in the function of the text itself. The question is whether or not we will do it. Or if we will simply watch the relationships between readers and texts change without thinking critically about what these changes mean, what changes we'd prefer, what changes we'd sooner avoid. In effect, it requires a critical commitment, not to what we will conclude that the text means, but to a process of criticism that is preoccupied with care, that is "interested" in the very hope that culture might truly be determined through a disinterested process of seeking what's best for human culture, rather than being determined by the tremendous social forces that have emerged as a default consequence of ademocratic processes of free market ideology. We must, as *Ars Industrialis* suggest in their 2010 "Manifesto," "struggle against carelessness [*incurie*], against the destruction of attention." [5] Such literary criticism must attend to that which is not immediately understood, but which holds power in the realm of expression, which animates the text, which is written, hard to notice, but nevertheless true.

In practical terms, as it pertains to the *Electronic Literature Directory*, there are two possibilities relating to the twofold process of the ELD's editorial protocols. On one level, it is a rather mundane, but necessary, meeting place for readers, writers, and works. The entries themselves really and truly do tend towards mere readerly descriptions. [6]

The second possibility, and this is one is highly contingent, is that database projects like the *ELD* may serve as a nexus for precisely the cultivation of care and attention in service of the social as the next logical step towards a criticism that is, to quote Matthew Arnold, "sincere, simple, flexible, ardent, ever widening its knowledge." In creating a common space, a public sphere for "electronic literature" that is open to all, we might inspire and cultivate a critical practice which is aware of the changing dimensions of the text vis-à-vis the discourse that takes place on our pages. What we lack in the slow deployment of verticality, we might gain in horizontality. If we grow large enough, not simply as a matter of quantity, but large enough in the depths of our social consciousness, we might take this broad horizon of literary

discourse and, in the crucible of speed, pressure, and the needs of the moment, distill a sense of just what these changes mean for criticism.

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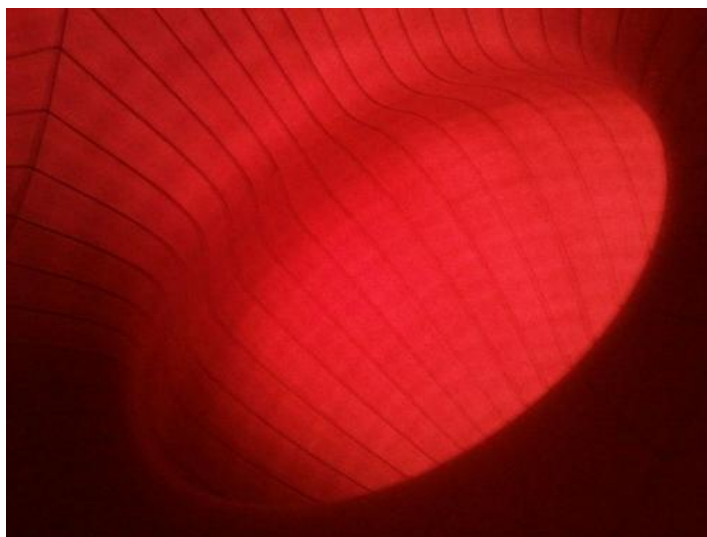
UNMEDIATED EXPERIENCE? RE-MEDIATING PHENOMENOLOGICAL APPROACHES

Christiane Heibach

The paper discusses the theoretical tension between the desire for unmediated experience formulated in some contemporary media philosophical approaches, and the evidence, that our experience is inherently related and maybe also formed by media. How can this tension be solved? And what are the necessary theoretical approaches for a model of perception that meets the demands of our multisensory and multimedia environment?

Processes of perception / Theories	Traditional Philosophy (Body/Mind-Dualism)	Phenomenology	Anthropology/ Sociology	Cognitive Sciences	Media Theory
Sensory perception	<i>Neutral standardized process with limited contribution to intellectual insight</i> Dominance of the visual as the most distant and therefore analytical sense	<i>Basis for our relation to the world - no neutral sensory input, because those data are always already interpreted</i> Dominance of the visual as paradigmatic sense	<i>Models of sensory perception are culturally different and depending on processes of communication within social communities</i> Culturally different hierarchies of the senses	<i>Biological and chemical processes of data processing in the brain based on standardized models → topography of the brain's sensory areas</i> Focus on visual perception (Semir Zeki)	<i>Sensory input is formed by the cultural dominating media → co-evolution between media and perception (Marshall McLuhan)</i> Dominance of the audio-visual
Intellectual	<i>Pure Insight/cognition comes from a priori knowledge that is solely preformed in the brain (Descartes, Kant)</i> → guarantee of rational and comprehensive realization of the world outside	<i>Principle of Intentionality (Husserl, Heidegger, Merleau-Ponty)</i> → Objects are part of us as they exist only the way they are given to our perception – no strict subject-object-division	<i>Dominance of the observer-object-relation → distant analytical processes of insight (although critically reflected in models of participating observation in anthropology)</i>	<i>Consciousness as complex process of world construction in the brain</i> → the constructivist power of the brain to create its own world questions the subject-object-division	<i>Standardized cultural techniques (reading, writing) are developed in co-evolution with the dominant media of a culture</i> → Intellectual processes are media-driven and not supercultural
Emotional	<i>Excluded from the intellectual insight</i> → Kant puts emotions to the subjective side of the faculty of judgement, the aesthetic experience as like/dislike-reaction	<i>The holistic psycho-physiological model of man (Merleau-Ponty, Schmitz) includes also emotional reactions on the perceived</i> → sensory perception and emotion are bound together	<i>Reflection of different cultural and historical models of emotion (e.g. Norbert Elias), social meaning of emotions (e.g. Niklas Luhmann), but: sociology relies on concepts of rationality</i>	<i>Differentiation of emotion/feeling (Antonio Damasio), the first is 'natural', instinct-driven, the latter culturally formed → unity of mind and body, but: no concept of sensory perception</i>	<i>Media cause emotion and trigger emotion – but:</i> Focus on film/literature → no reflection on the cultural formation of emotions
(Re-)Action	<i>Action is not part of traditional philosophical reflection – unless it is mental action → e.g. processes of decision (ethics)</i>	<i>No model of action – the concept of intentionality might be seen as a kind of proposal but resembles more the mental models of traditional philosophy</i>	<i>Models of action mostly concerning rituals or standardized social action driven by rational motives and excluding emotion and subconscious processes</i>	<i>Action as result of complex neurological processes triggered e.g. by hormones, but also by other cognitive processes → basic emotions in oscillation with rational thinking</i>	<i>Different concepts of action:</i> - interacting with technical media - acting within media (e.g. strategies of self-marketing)

Table 1: Overview of different epistemological concepts from different disciplines (© by the author).



Anish Kapoor: *Leviathan* (2011), *Interior* (photo by the author)



Anish Kapoor: Leviathan (2011), Exterior (photo by the author)

During the last few years – and very obvious for example in some panels of last year's ISEA – one can observe a somehow paradox tendency: Theorists coming from the philosophy of media tend to dream of a sort of “unmediated experience” as the Canadian philosopher Brian Massumi called it, [1] and media artist and theorist Christopher Salter spoke of “felt meaning” as a form of insight which lies beyond the traditional concept of language driven consciousness. [2] Another example: Mark Hansen, author of the book “New Philosophy for New Media”, [3] re-animates a concept coined by Henri Bergson in the 19th century: the bodily affection which Hansen describes as holistic psycho-physical perception mode and confronts with contemporary audio-visual media. In his explicit concentration on the perceiver Hansen neglects the anthropological dimension of technical media which Marshall McLuhan had pointed out: that human perception has always developed in co-evolution with a culture's preferred media. Furthermore, Hansen's (and the Bergsonian) concept of “bodily affection” remains rather vague, just like the other concepts of an unmediated, embodied experience: Mainly they don't distinguish between the different sensual perception modes – the body appears as a homogenous whole that is constructing its own experience of the world, and they assume that there could be a primordial experience without any preformation by nature or culture.

This longing for an unmediated experience which is based on an unspecified unity between body, mind and environment refers to phenomenological approaches in philosophy, which developed at the beginning of the 20th century: As already mentioned, Mark Hansen refers to Henri Bergson, who had significant influence on the founder of Phenomenology, Edmund Husserl, and later also on Maurice Merleau-Ponty; Brian Massumi in turn refers to 19th century psychologist and philosopher William James, who on his part influenced Husserl and Deleuze. James introduced the concept of “pure experience,” [4] an experience which lies before any subject-object division and – this is the logical consequence – seems to be pre-medial; a non-mediated physico-emotional way of experiencing the world before it becomes a separate part of oneself.

Phenomenology developed during a time where daily life in European countries at the beginning of the 20th century underwent deep changes: There had been an accumulation of technical developments like the steam engine, electricity and the new media photography and film – all significantly changing our

perception modes. Phenomenological approaches like those of Edmund Husserl (1913), [5] Helmuth Plessner (1923) [6] and later Maurice Merleau-Ponty (1945) [7] opposed to the traditional epistemologies that had emphasized intellectual insight as independent from the body and equated sensory perception with visual perception. The changing epistemological environment proved the contrary – and the traditional dualistic mind-body separation seemed to come to its limits in facing the acceleration and multisensory appeal of the electrified cities and technologized perception modes.

It also might be no coincidence that the revival of phenomenological approaches is correlated with the diversification of our self-experience we currently undergo. The paradox, that theorists and practitioners who have been moving within the universe of new digital media, now call for a pre-conscious, non-intellectual, unmediated and primarily physical and emotional experience of the world, might even be a logical consequence facing a world that becomes more and more complex and where we are confronted with a multimedia environment that challenges our current models of perception and the dominance of intellectual insight.

In our every-day life we have to play multiple roles in different medial environments: communicating with friends in social networks like facebook, managing our daily real life environment, proving our intellectual capacities in our jobs, being active in our leisure time with sports, cultural events etc. All this also means managing multiple media like TV, Radio and Internet, but also diverse sensory, affective and intellectual inputs of places that are part of our daily life: be it the sensory appeal of shopping malls or wellness environments or cultural sites. The longing for an unmediated experience might be a logical reaction to this intersensory and intermedia overload. But is the current tendency to turn away from the media and praise an unspecific holistic bodily experience that ignores media theoretical acquirements really a solution for the problem that we need a more complex model of perception? I doubt this – and would like to illustrate the demands of a model that reconciles concepts of embodiment with media theory in turning to an example of a work of art:

In 2001 the Mexican artist Teresa Margolles presented her work “Vaporización” – “Vaporization” in Berlin. It seemed to be a quite simple work: The visitors entered a room which was filled with a fog-like substance. Their sight was limited, but they felt the humidity of the fog on their skin and of course inhaled it by normal breathing.

This was all – so what the visitors experienced was first of all the atmosphere of a quite dark and foggy room full of a humidity that not only enwrapped their bodies, but which also became part of their organism through the pores of their skins and through breathing in. Finally the visitors were informed that the humid fog consisted of water that was used to wash the corpses in the Mexico City morgue. Although it had been disinfected the experience of breathing water that had become part of nameless corpses and that now became part of the own body has something deeply frightening and might in most cases have caused the emotional reaction of deep disgust, and probably also the feeling of somehow being physically misused by the artist.

This becomes very obvious in a variation of the concept, a work called “In the air” from 2003 (En el Aire). I would like to quote a description I found in the World Wide Web (published under the author’s name or pseudonym “Lolla Moon”):

“In the museum’s soaring hall children play under bubbles that come from Teresa Margolles’ piece En el Aire (In the Aire 2003). Running, laughing, catching, they are fascinated by the glistening, delicate forms that float down from the ceiling and break up on their skin. A common motif in art history, the bubble

has long been used as a memento mori, a reminder of the transitory nature of life. The children's parents, meanwhile, studiously read the captions. Suddenly, with a look of disgust, they come and steer their offspring away. The moment of naïve pleasure turns into one of knowing repulsion: they have learned that the water comes from the Mexico City morgue, used to wash corpses before an autopsy. It's unimportant that the water is disinfected; the stigma of death turns the beautiful into the horrific." [8]

This example and the description show a further dimension of Margolles' two works: The visitor is not only concerned with her own body and the proprioception in realizing what has touched and somehow invaded her body, but also with the instinctive impulse of protecting her children from being confronted with death, and probably with the body of dead people one had not even known. The intimacy of getting touched by someone is combined with the covering-up of death in our Western cultures. So Margolles' work breaks multiple taboos:

- First of all she minimizes the distance between the material she uses for the installation and the visitor. The material finds its way into the organism of the visitor and somehow melts with parts of her because the perception organs are not the distant senses ear and eye but the skin and the nose, sense-organs which have long been aesthetically ignored and therefore somehow lack any aesthetic tradition and education. So the medium chosen (the fog), and the triggered sense organs are quite unusual and challenge our standardized perception habits – which is the epistemological dimension of the work.
- Secondly she confronts the visitor with her (the visitor's) own body and her relation to other - dead - bodies, which rises ethical questions. At least it confronts us with our culturally influenced attitude towards death and towards anonymous corpses from a country where for many people survival is a challenge which has to be faced daily anew in drug war and crime – this is the intellectual and cultural dimension.
- Both together – the transgression of perception habits and cultural taboos – lead to a deep psychophysical experience that shows that intersensory perception, intellectual and cultural knowledge, emotion (disgust) and feeling (horror), and finally also action (taking away the children) are inherently bound together.

This example is so interesting because it ignores one unwritten law of art: to leave the recipients in a state of autonomy where they can decide whether they want to participate or to draw back and stay an observer. This choice is essential to keep the playfulness of art, even in borderline cases. Just to name one example: The Austrian Artist Hermann Nitsch organizes every year what he calls "Orgien-Mysterien-Theater" ("bacchanal-mystery-theatre") where a lot of animal blood and bowels are spread among the participants. Nevertheless it is left up to the audience whether it wants to participate or not, and at least everyone knows in advance what expects her/him when visiting such an event. Margolles instead confronts us with a part of our real life we normally tend to push aside in minimizing the distance art normally builds up between itself and the spectator/visitor: She uses a medium, water, which stands for cleanliness and purity, and brings this together with the visitor's body as medium so that both merge through breathing in a process which happens beyond the visitor's control.

In table 1, which of course is not exhaustive but rather a scheme, I tried to sum up the main theses of different theories dealing with the problem of perception and experience from different perspectives.

The leading question for this overview is the topical demand for a combination of intersensorial and intermedia theories. The table will show that in most cases media are neglected – and with this the social and cultural aspects of perception/experience.

This overview refers to approaches of very different disciplines and examines how they treat the processes which I consider to be decisive for the complexity of experience: Multi- or intersensory perception, intellectual and emotional processes as well as concepts of action. It is obvious that every approach has its blind spots – consequently setting up a model for ‘experience’ is an inherent interdisciplinary task. And it shows that nearly all approaches lack a notion of media, in first place Phenomenology which claims to explain the processes of every-day-experience – but its approaches prove to be incomplete without considering the multiple impacts of natural and technical media. I doubt the existence of an unmediated experience, although a pre-conscious “feeling” surely belongs to what we call experience. But, as Helmuth Plessner and Maurice Merleau-Ponty point out, there is no sensory perception – and, I would add, no unmediated experience – without interpretation: even if our interpretative mechanisms are based on biological and chemical processes in the brain, they are also culturally and socially induced. In concentrating so much on technical media we tend to forget that our experiencing senses and our feeling body are media as well, as Margolles’ piece “Vaporización” shows. Without our culturally induced neglect of death, without our instinct-driven, but also culturally formed scepticism that tells us to keep distance from everything which does not belong to our own bodies, the effect of “Vaporización” would not be this provoking as it has been proven to be. Margolles uses the human body as medium: first, the particles of the corpses are merged with the water so that they are transformed, then the bodies of the visitors become media in absorbing and again transforming the corpses’ cleaning water. In this constellation the visitor’s bodies are object and subject at the same time.

I want close this contribution with another example: Anish Kapoor was the invited artist for this year’s Monumenta in Paris. For the Grand Palais, a very light and beautiful architectural construction, he created a sculpture he called “Leviathan”:

“Leviathan” is the name of a beast which was created by God in order to reign over the sea. It was invincible and could only be defeated by God. According to the Babylonian Talmud Leviathan (who exists in Christian and Jewish tradition) studies the Tora, judges and nourishes the world and then plays with the ships on the sea. So Leviathan has become the synonym for a monster that causes chaos and is unrulable. Kapoor’s “Leviathan” does not move, but it swallows everyone who comes to visit: thus it has a monstrous inner and outer appearance (as the images show), but both work very differently: Within the monument one feels as if being swallowed by a whale like the biblical Jonah. The dimmed red light (which has a natural source from the glass roof of the Grand Palais, filtered by the red synthetic skin), the sticky air, the damped sound and the very round shape that branches into cave-like bulges evokes associations of being in the stomach or bowel of a beast or in an uterus (but without the protected feeling one should have there). Stepping outside the impression is completely different: One sees “Leviathan” as a sculpture from a distance, the light is natural again, the air fresh, the sounds have regained their resonance – it is an object again and can be treated as such.

“Leviathan” offers us at least two perspectives: One is unusual and challenges our sensory perception, our psychophysical proprioception, and our intellectual ability of evoking associations, the other offers us the far more familiar perspective on an object which can be experienced mainly visually as a sculpture (but also in touching its skin) and lets us feel much more comfortable because we can remain in our culturally acquired habits of perceiving art. Kapoor thus oscillates between the creation of an interior media arrangement causing an experience that differs from our everyday perception on the one hand,

on the other he creates an outside space that allows us to regain our usual perception modes – “Leviathan” changes between unfamiliar and familiar intersensorial and psycho-physical forms of experience. This indeed seems to me to be one of the most valuable qualities of contemporary (inter-)art forms and it makes obvious that the newly evolving desire for unmediated experience is somehow romantic, but not realistic and not necessary at all if a complex model of experience is adopted.

So consequently the complexity of multi- or intersensory experience is not adequately modelled in adopting only one concept, be it

- processing sensory data, even if multisensory perception is considered,

or be it
- experiencing a pre-conscious holistic bodily affection with its related emotional processes,

or be it
- biologically explainable cognitive processes

or be it
- ‘pure’ intellectual insight.

All of these approaches are complementary, and they are always related to individual and cultural experiences (emotions, knowledge, habits) and media, which means natural and technical media alike. The examples should have made clear that there might be no unmediated experience, and that intense experience is a complex combination of multiple factors that can only be treated in an interdisciplinary effort.

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INVESTIGATING INTERACTIVE BEAUTY – A RESEARCH-ART INSTALLATION

Falk Heinrich

My paper presents and discusses my academic-artistic installation *Investigating Interactive Beauty (IIB)* being part of a theoretical investigation of the notion of beauty in interactive art. *IIB* is on the one hand an art installation and on the other hand an experiment that allows for collection of user opinions and experiences. Interviews and questionnaires, one prior and one, seek to collect opinions on the notion of interactive beauty.



Fig 1. Investigating Interactive Beauty – a research-art installation 2011

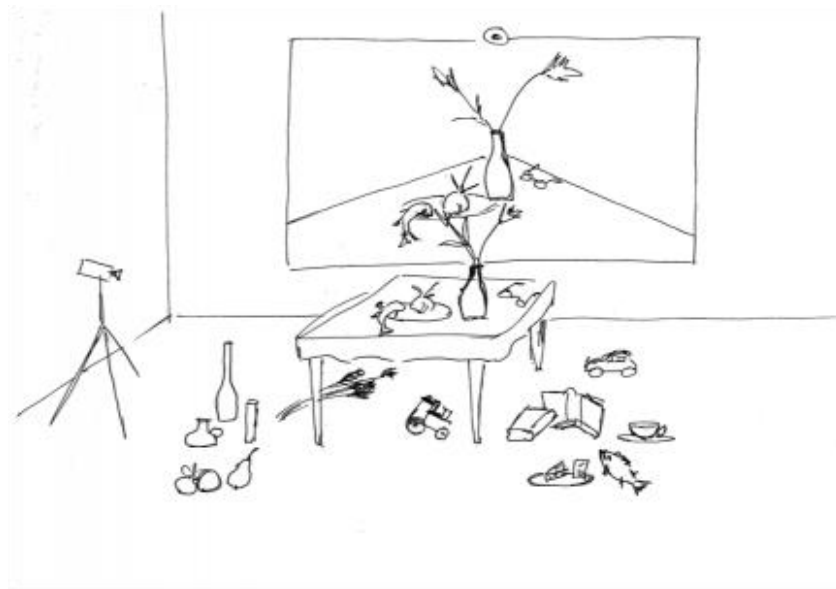


Fig 2. Sketch of Investigating Interactive Beauty, 2011

This is a presentation of the academic-artistic installation *Investigating Interactive Beauty*, preceded by a short introduction to the overall research project *Interactive Beauty*. My field of investigation is the notion of beauty in interactive art.

In academic literature, beauty is often described as an aesthetic judgment of an artefact or an object. It is generally seen as a sentiment of positive arousal. During modernity, art has been positioning the onlooker at a 'distance' allowing for a sublimation of the onlookers' immediate physiological reaction to the piece of art. The distinction between reality and fiction is one prominent example of this distance. Art works are to be contemplated. This gave rise to a distinct notion of beauty that is tight to 'emotional reflection' underpinned by the purposelessness of art (Kant). But different philosophers have different views on, whether beauty is an immediate emotional reaction or whether interpretative reflectivity plays a part in the sentiment of beauty. Beauty is generally seen as a positive experience; it is nevertheless founded on a perceptual distinction between beauty and ugliness. During the century of modern art, both its artistic and academic proponents, reject the validity of beauty for art making. Yet, there are also other voices stressing the historical changeability of the notion of beauty. For example, Roger Fry's *Vision and Design* (1961) asserts that the initial ugliness of modern art already has become beautiful since art changes its notion of beauty. The sentiment of beauty in modern art shifts from being an exclusively aesthetic judgement to be interplay between conceptual and 'purely' aesthetic dimensions.

The following thoughts and the conducted experiment is based on the belief that the sensation of beauty is an emotional reaction framed and generated by cultural and conceptual values; there are no essential and normative requisites for beauty. Nevertheless, I do not see beauty as an exclusive driving power for art; our notion of beauty today is highly dependent on other cultural developments like media technology and media artefacts (video games, interactive TV, computer applications and apps).

Foundational thesis

The shifting notions of beauty from the Renaissance up to modern and post-modern art rely on a distant positioning of the onlooker in front of the artwork. There have been many efforts to make the audience a part of the artwork, like for example installation art, performance art, and recently interactive art. In interactive art the onlooker has finally become a participant physically acting and reacting within the timely and spatial framework of an interactive art piece. Consequently, there is a need for a differentiated notion of beauty that takes into account the beauty of doing, (re-)acting, performing, and creating within a conceptually confined space of possible interactions. My hypothesis is such: the experience of beauty in interactive and performative art pieces has changed (or is in the process of transformation) from being an act of contemplation to (1) an intrinsic sentiment of interaction proper and (2) a reflective post-actional sentiment.

My investigation is mainly a theoretical one relying on philosophical inquiries, trying to answer a whole array of questions: Is the notion of interactive beauty an indication for a changed socio-cultural context or is it a phenomenon exclusively bound to interactive art? Can we trace a changed notion of beauty taking into account historic philosophical theories on beauty from the Greek Classics to modernism and post-modernism? The notion and sentiment of beauty is without doubt context dependent rendering different dimensions of beauty, what is then the relationship between let's say design and art, or the blooming beauty industry and interactive art? My hypothesis has its roots within the domain of art and art experience being thus a research question within the domain of aesthetics and art theory, but do other scientific disciplines have different notions of beauty - I here think very much of design theory and

marketing, psychology and neuroaesthetics - and how can these disciplines contribute to my investigation?

Artistic Investigation as academic method

Despite the overall theoretical modus of my investigation, I nevertheless want to describe an empirical experiment that tries to tap into the interactive art participants' opinions on the question of beauty. Since the question of beauty in modernity and post-modernity is considered to be a subjective judgment and not the result of a normative doxa, a phenomenological method of investigation is the only appropriate one. The overall method of my research is a circular (or cybernetic) process, consisting of firstly theory formation as a discursive process that questions and re-describes already existing theories on beauty, and secondly the validation of my theoretical findings by means of observation and analysis of interactive artefacts by various artists as well as own artistic experiences. It has to be emphasised that most interactive art works do not specifically investigate beauty, yet it is my conviction, that all operate with the sentiment of beauty (or ugliness). This cybernetic process takes as its starting point my own experiences as a participant of numerous interactive artefacts as well as my experiences as a maker of such artefacts serving thus as a lived and internalised background for my theoretical research. In this I follow a well-established, discursive, hermeneutical research methodology, mainly found in the humanities.

In addition to my own experiences, I decided to design an experimental setting in form of an interactive art installation. The objective of this experiment is to generate empirical user data, through, firstly participant observations, and secondly interviews. It is my hope that the results will broaden my own understanding of the function of beauty in interactive art. Contrary to the modus of experiments prevalent in the natural sciences, the goal of my experiment is not to verify or falsify a hypothesis, but rather to create a framework for concrete interaction, which allows me to further my own understanding.

The interactive research-art installation should therefore encompass both an artistic experience of a kind and a reflective perspective on the nature of beauty in interactive art. In other words, the research-art installation aims at an experience of interaction that thematizes and discusses the notion of beauty. The objective cannot be to design beautiful interactions (because beauty is a subjective sentiment), but to design an installation that contributes to the discussion of the notion of beauty in interactive art.

Designing an interactive research-art installation gives rise to many questions and challenges. One of the foundational questions is, whether it is possible to design an installation that serves art and academic research alike. As such, my experiment forms part of an already existing, but still incipient academic praxis, where artistic methodologies are used to generate a field for observation that can render different understandings of a chosen subjects (e.g. Leavy, 2008; Kaplan 1996). Artistic processes rely firstly on certain art genres and secondly are scientifically idiosyncratic explorations without a fixed goal in terms of solutions to predefined problems. Academic humanistic research on the other hand depends on a thesis and a method that generates answers. By applying an artistic method, I therefore cannot hope for definite answers, but expectantly for rather vague indicia showing general tendencies, and new valuable questions to be answered. My investigation reckons the dependency on art genre and general cultural developments. In that, it differs from for example the neuro-aesthetic (e.g. Zeki 1999, 2004; Ramachandran 1999; Turner 2006) and psychological approaches (e.g. Arnheim 1969; Boselie, F., & Leeuwenberg, E., 1985), which aim at finding generic perception principles for the sensation of beauty.

The design of the interactive research-art installation *Investigating Interactive Beauty (I-I-Beauty)*

The basic idea of the experimental installation is the seemingly contradictory notions of contemplative and interactive beauty. In the research art installation, the former is represented by the static representational genre of *still life*. The latter by the very artistic act of creating and composing *still life* set-ups. In that I am following one kind of interactive art, where the art piece offers and uses the participants' poetic (creative) impetus. The installation will give the participants the opportunity to create a physical model of a *still life* and see the photographic result of his/her arrangement real time.

The installation space is a square space. A table with covered white cloth is standing in the middle. Upon this table, the participant can put and arrange various objects found in many still life paintings: vases, flowers, food, dead animals, etc. The objects are scattered on the floor around the table. The whole scene emulates our romantic picture of an artist's studio. The participant can use these objects in order to create their personal still life arrangement on the table. The participant can illuminate the scene with a simple set of lighting devices (front and side lights). The camera, constantly recording the still life, is positioned in a 45-degree angle in front of the table. Behind the table, a projection shows the video picture of the table and the arranged still life.

But the picture is not a photorealistic depiction of the material still life arrangement; it shows a digitally manipulated picture. The degree and kind of modification depends on the amount and kind of the participant's physical action around and on the table. An infrared camera and various algorithms track the participant and extract a data-description of his/her movements and motion in space. These data are used to digitally manipulate the video image.

The modification of the video picture is inspired by some exponents of art history's development from representational art to various kinds of motion abstraction (Balla, Boccioni, M. Duchamps, Muybridge) and the aesthetics of digital image manipulation. The modification process is triggered and computed by the data of various movement parameters (especially the accumulative quantity of changed pixel values). Despite of the fact that motion results in modification of the digital image and non-motion in a slow transformation back to a photo-realistic, static representation, the detailed algorithmic logic is not completely transparent. The transformational logic should be a part of a semi-enigmatic process controlled by the algorithmic system.

The experiment

The experiment begins with a short initial introduction to the overall objective, namely the investigation of interactive beauty and to the aesthetics of the chosen genre (still life). The research-art experiment is framed by an informal interview structured by questions.

1. The first part of the experiment consists of three initial questions:

Could you briefly describe your sensation of beauty?

How would you describe beauty in art?

Have you ever experienced beauty in interactive art (as a participant or as an onlooker)?

The pre-interaction questions seek to get information about the participants' general notion of beauty and specific notion of artistic.

2. The second part consists of the interactive experience. The participant is supposed to create a still life out of the available objects. S/he can decide to finish the experiment by clapping the hands, which makes the system save a file of the digitally manipulated picture.

3. After the short interactive experience, I pose more guiding questions:

Can you describe the relationship between the intended beauty of the tableau and the experience of arranging the tableau?

What elicits satisfaction and reward in the process of composing the still life?

Can you describe the difference between the unmediated and the digitally manipulated of picture?

The purpose of these questions is solely to propel a general discussion on the notion and function of beauty in interactive art.

Preliminary results

At the present moment, the research installation has been tested (both the digital system, the set up and the questions for the interview), but no real research experiment has been conducted. The test interviewees were students of the educational program Art and Technology at Aalborg University. The purpose of the tests was to examine the validity of the questions asked, the functionality of the artistic research installation, and the discovery of unintended aspects. In the following I am presenting the main points made integrating the interviewees' wording into my interpretation of it.

The first interview did reveal that the notion of beauty is associated with "attraction", "pleasing objects", "kindness" and the "simplicity and purity" of the object eliciting the urge to be "near and observe" the objects. Beauty is a kind of "positive" holistic conclusion made by audience, beauty sets "a period!". Beauty in art is associated with both the sensuous aspects ("awareness") but also with the conceptual aspects. A "great and strong artistic idea" with a vital "message" is beautiful. In regard to interactive art, the interviewees pointed out that a requisite for the sentiment of beauty is a "clear understanding" of the interaction mechanisms. A beautiful interactive art piece "talks to and attracts" the participant. One interviewee asserts that beautiful interactive art pieces must make sense also without the user participation, which I interpret as the clear conveyance of the conceptual dimension of an artefact.

The second part of the interview after the interviewees' experiences with the interactive still life installation revealed, that the interviewee generally like to interact and having the possibility to create and arrange their own still life (which of course is not surprising, since they all are art and technology students). They felt good as a participant being able to choose certain objects and to disregard other in the process of arranging the still life. They all sought to express a personal idea about the intended still life. Some of them chose the objects due to their symbolic value. They acknowledged that their personal vision is heavily influenced by genre paradigms and conventions of still life.

There seems to be an unintended gap (for one interviewee even an incompatibility) between the arrangements on the table and the digital representation of the tableau. It seems that the experiment deals with two different forms of interaction, a mediated and an unmediated one. This led me to a bi-partition of the second part of the experiment. In the future, the participants will be asked to focus on the arrangement of the still life (the video picture will show the tableau non-manipulated), and, in a second round, to focus on the digitally modified picture in order to elaborate on the different mediation modes.

Discussion

The experiment needs of course to be conducted for real with a demographic variety of persons interested in interactive art. This paper deals primarily with methodological questions in regard to the design of a research-art experiment as a qualitative method.

I could simply have conducted interviews with audiences of relevant interactive art exhibitions. But designing an experimental research-art installation fulfils at least one further goal apart from the collection of user experiences and opinions. The process of designing an experiment with an academic purpose (in my case the generation of user experiences of the function and sentiment of beauty in interactive art) reveals much of the nature of my research subject. For example, the notion of beauty is extremely domain-dependent; there no longer exists a general notion as in Schiller's era, where beauty indicated a unified moral and aesthetic refinement. Today's beauty is not able to defy the experienced fragmentation of life, revealing the obvious subjective quality of beauty.

One preliminary result of the test scenario seems to show that beauty in interactive art is not exclusively bound to the individual experience of interaction. The interviewees' experiences were described as funny, interesting, and rewarding since the participants are given the possibility to tell their own stories and preferences (through the choice and arrangement of still life objects). Yet, the experience of beauty seems to necessitate the objectification and extrapolation of interactive experiences into the realisation of the artefact's conceptual dimensions. The test persons seem to merge and align their existing contemplative notion of beauty in the arts with their performative acts during interactions.

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FUZZY PRECINCTS AND BLEEDING EDGES: FEMINIST THEORY AND THE STUDY OF VIRTUAL-MATERIALITY

Lynne Heller

Following a trajectory of the virtual/material dichotomy as it stems from a classicist position of a mind/body and male/female split, I propose feminist theory as a potent tool to effectively analyze the artistic implications of virtual materiality. Obfuscation, bedlam, redundancy – these qualities, redolent of humanity, are typically considered the antitheses of insight. The chaotic can be an impetus for relinquishing conceits of specialization.



Fig 1. Dancing With Myself, 2009, Lynne Heller, hybrid reality performance, Copyright Lynne Heller.

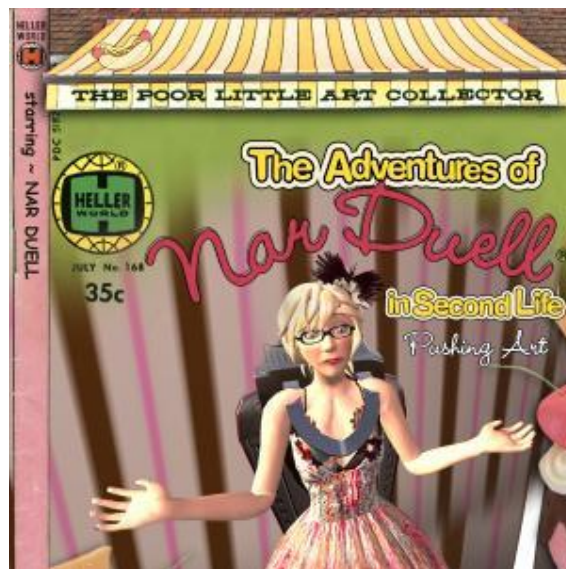


Fig 2. The Adventures of Nar Duell in Second Life - Pushing Art, 2010, Lynne Heller, graphic novel, Copyright Lynne Heller.



Fig 3. *The Adventures of Nar Duell in Second Life - Pushing Art*, 2010, Lynne Heller, graphic novel, Copyright Lynne Heller.

Whatever the breaks and ruptures, only continuous variation brings forth this virtual line, this virtual continuum of life, "the essential element of the real beneath the everyday."
Gilles Deleuze and Félix Guattari [1]

As an artist working in diverse media – performative new media interaction, digitally collaged graphic novels, and hybrid reality sculptural installation, I have had the opportunity to experience a breadth of contemporary creative practice, unfettered by traditional labels.

My art reflects my fascination with the yo-yo play between the two ends of a spectrum, at one end the virtual, on the other, the material. Integrating perceived oppositions has been an ongoing creative concentration for me. By essentially not 'fitting in' to any particular artistic convention, I have been free to create my own structures which inevitably pose questions of differentiation. If the two extremes, virtual and material constructs, meet and interweave on an intimate stratum, then how does one start to parse and separate them? Is it possible and / or desirable? When imagination and concrete details fuse at a molecular-like level, is it useful to consider these as separate parcels? Are packets of digital information virtual or real? Perhaps neither virtual / spirit or material / substance but simultaneously both, a unique process or matter that I will refer to throughout this paper as virtual-materiality. Analogous to light – an often invisible continuum that is defined only when it comes into contact with something else, creating colour and shadow. It is not defined by established theoretical frameworks, but through the interpretation of its internal limitations. [2]

By way of example, in my piece *Dancing With Myself* (2009), a performative hybrid-reality installation, I explore virtual-materiality through dance. My avatar, Nar Duell, has been scripted to perform a choreography. In real time performance she moves in an immersive environment projected onto three walls. I

respond to Nar Duell, attempting to create a duet with her, thereby inverting the person / avatar paradigm, as Nar Duell controls me. Her world is expansive and infinite, whereas the real world space where I respond and dance, a white-walled gallery setting, is boxed in and confined: once again reversing the usual view of space through a computer screen. At the end of our performance, when she has either 'expired' or perhaps is 'just plumb tuckered out', I stroke Nar Duell's face. In reality, I am touching the cold hard surface of the gallery wall, nevertheless, the warm presence of projection and the intimacy of our interaction conjures up an all too posthuman relationship. [3] Through this caress, undeniably material things (human hand, painted drywall) become conflated with the agency that I have invested in my avatar. The action ceases to be touch of simple surfaces and strives to cross a divide. Unable to label this moment virtual or real, even digital or analogue, I can only think of it as quintessentially virtual-materiality. Nar Duell's exhaustion is clearly virtual and I am most decidedly material, but the act of touching my avatar transcends an understanding of those two states. Similarly, in another piece, *Pushing Art* (2010), I display a video projection of my hybrid-reality graphic novel in a real-life mobile rendition of a hot dog cart and newspaper stand – once again confounding boundaries. We are no longer dealing with differences but with a continuum that defies parsing.

The turning point of this argument depends on the idea of the agency of images, addressed by the theorist W.J.T. Mitchell in his seminal text *What do pictures want? the lives and loves of images*.

...the peculiar tendency of images to absorb and be absorbed by human subjects in processes that look suspiciously like those of living things. We have an incorrigible tendency to lapse into vitalistic and animistic ways of speaking when we talk about images. It's not just a question of their producing "imitation of life" (as the saying goes), but that the imitations seem to take on "lives of their own." [4]

The most basic of human interaction with objects, particularly images, causes us to necessarily invest them with spirit in order to understand, control and dominate the 'stuff' of our existence. From a simple photograph of a loved one to the complexity of a virtual alter-ego we must process what we are looking at through memory and emotion. When my avatar, Nar Duell had the misfortune of a corrupted database I had to come to terms with the zeros and ones of her being. For an entire week Nar Duell and I had to sustain the indignity of having her hair attached to her posterior as she inhabited her Second Life world. She slunk around assuming poses where other avatars would not view her backside and the offending tresses. Clearly, I was projecting my embarrassment as a human being on this animation, but her bizarre behaviour was real within the context I had created, and made for an entirely different art experience. As a result of the misplaced hair episode it became clear to me that Nar Duell was protesting the brunette hair I had bought her only an hour before the data corruption occurred. She is now, and for whatever future she has, decidedly blonde. What's a feminist to do?

Before discussing virtual-materiality any further, I would like to differentiate between the digital and the virtual. The digital is real enough on a computer chip, but because it exists initially as information only and must be transformed through on and off circuitry to be experienced, we perceive it to be virtual. Even though it must be processed to be experienced and not an obvious material manifestation, it is not virtual. Whereas the truly virtual resides only in our minds and through our imaginations. It is ironic given my interests in continuum that I am insisting on difference here but I think it is important to define the terms as they are often used interchangeably. Virtual-materiality is not necessarily digital-materiality. Digits are representations just as surely as is paint. However, the malleability of digital information and the variety of its manifestations does extend our ability to imagine 'bigger and better.' In my case it allows me to create Nar Duell and experience art and life right alongside her. The quirkiness of a populous, dumbed-down application such as Second Life along with the reality of bandwidth speeds and

other people's tastes means that it is an entirely unpredictable place. This eccentricity leads to the illusion of avatars in that environment possessing souls and controlling their own destinies – a virtual existence.

As I said in the beginning of this text, the genesis of this interest in virtual-materiality comes from my engagement with different media. That, in turn, is rooted in a deeper need to grapple with the contradictions of our humanity. There is a gap between our desires and reality which align with virtual / material extremes. By trying to define these edges I find myself in the wide swath of the middle, where the melding is impossible to untangle. If desire equals the virtual, where everything is possible, and reality, the material weighed down by the intractability of matter, then how do these extremes coalesce? Fortunately, art does not have to be an either / or proposition, it is both at once – a lenticular vision, beyond simple interpolation, that does not allow for the splitting of the atom.

This paradox, desire versus reality, is threatened to be rendered mute by contemporary consumerist ideology, and is echoed in pop cultural priorities. I look to pop culture as a marker to test my assumptions about yearning and that which is 'in your face' real. The drive to conflate those extremes, which I align with the virtual and the material, is a current obsession. For instance, three dimensional film techniques attempt to make a screen-based art form increasingly immersive and tangible. On the other hand, many material based artists, entertainers and marketers are using the advantages of digitally generated or transfigured materials and processes to invest the inert with intelligence. Of particular interest are technologies such as motion capture and mobile devices that allow intersections of real and digital immersion, crossing over into virtuality. An example of this is the mobile smart phone that allows razor sharpened marketing intelligence to guide the user into real world / virtual seamless consumer experiences. The interest in the public sphere is informing and compelling. When the difference between desire and commodity is supposedly erased, we can have everything we want and like everything we have. Or – so the story goes – this perpetuated fantasy is the bedrock of consumerism. However, it is an itch that gets worse with scratching. This presumably seamless virtual-materiality highlights the contradiction of the continuum. Even though we cannot dissect virtual-materiality we still know the two extremes. Capable of a double consciousness, we sense difference and conflation simultaneously. We believe desire and object to be the same thing. Obtaining something will soothe a yearning, but the very act of possession provides unassailable proof that objects are not spirit, and fuels anew fresh cravings.

Following the trajectory of the virtual / material dichotomy as it stems from a classicist position of the mind / body split, and manifestations of the male / female divide, I propose feminist theory as a potent tool to effectively analyze the artistic and sociological implications of virtual-materiality. Plato conceived that the body is from the material world; and the soul is immortal, of ideas and universal truths, and does not exist in time and space. In this sense, the soul is temporarily united with the body and will separate at death. Descartes' theory holds that the body works like a machine with material properties, and the mind or soul is a nonmaterial entity. In this conception, the mind controls the body. I believe these dominant philosophical stances are instrumental in understanding polarities outlined in this text, and how they have come to be defined in opposition to each other. Traditional views equate technology with machine, attributed as male and related to the sublime and power; whereas beauty is often the stand-in and proponent for the aesthetics of the organic, the compliant and gendered female. Theorist Elaine Scarry discusses this perspective in *On Beauty and Being Just*:

...in the newly subdivided aesthetic realm, the sublime is male and the beautiful is female...Why should this bifurcation have dealt such a blow to beauty...? The sublime occasioned the demotion of the beautiful... Formerly capable of charming or astonishing, now beauty was the not-astonishing; as it is also the

not-male, the not-mountainous, the not-righteous, the not-night. Each attribute or illustration of the beautiful became one member of an oppositional pair, and because it was almost always the diminutive member, it was also the dismissible member. [5]

Scarry's critique around the issue of beauty provides pivotal clues and associations for a discussion of virtual-materiality within a feminist perspective. Once again, a 'pairing' of the sublime / beauty equals the virtual / material. But beauty, with its quicksilver qualities, helps to destabilize easy polarities. Dichotomized thinking sets the stage for an avalanche of 'thought', in all its virtual importance, overwhelming 'tangible', often just pretty and overlooked. At a micro-level, virtual-materiality, as continuum, is the antidote to definition and demarcation.

As a woman who came of age during second-wave feminism, I have a strong interest in formulating what a feminist position means to me as an artist, and particularly in my strategy of taking on an alter-ego. The relationship between myself and my avatar could be best characterized within a feminist context, as a mother-daughter bond. I have created Nar Duell, but I am at the mercy of her physics. Limitations and strengths determine what we can do together. I nurture Nar Duell, but it is the unforeseen and unknowable combination of what I have 'fed' her that makes the work live. But what of neo-feminism? From the simplest of decisions – what colour hair to purchase, to which friends to accumulate, one is always hyper-aware of gender in Second Life. Nar Duell's personality reveals a full range of contradictions. She strives to be nice, agreeable, conciliatory and shudders at the thought of looking dowdy for the sake of politics; but is thoroughly empowered when flying around in her super-cape. She wears a hard hat because she does a lot of building in Second Life. At the same time, she wears short, tight skirts, cat ears, fishnet stockings and stilettos – performing her own, one-woman, slut walk protest.

The reality of online virtual worlds is that they tend to be highly charged, sexualized places, full of fruitful data to examine contemporary male / female ideology and practice. The writers R. A. Brookey and K. L. Cannon, in their article *Sex Lives in Second Life* say "there was a great deal of optimism about the potential for virtual environments to offer users opportunities to explore multiple identities." [6] However, they conclude on a very different note: "Arguing from Foucault, we suggest that cyberspace should not be regarded as an environment that moves the user outside of the political and social matrix of gender and sexuality." [7]

We cannot entirely escape our bodies, our innate materiality within the virtual, since it is primarily a product of our history and societal imperatives. What we dream into existence is limited by what we have already, and what we have already is largely a product of what we are and the 'things' that surround us. Sometimes it appears as though the material trumps the virtual. However, the virtual is extremely robust and infects the real at the sub-particle level, making it impossible to root out. We only know it when we see it in the extreme.

My need to reflect on our human condition through virtual-materiality is a romantic notion. Although instead of peering only into the enormity we call nature (the material) and feeling awe (the virtual), I look into an abyss of technological change and find a similar wonder and incongruent beauty. Mess, obfuscation, bedlam, redundancy, contradiction – these qualities, redolent of humanity, are typically considered the antitheses of insight. They confound compartmentalization. Perhaps the necessarily chaotic can be an impetus for 'soft' thinking that relinquishes conceits of specialization and repudiates the polemics of division. By breaking down ideas of difference using visual and aural language, artists can directly encourage a bleeding of thought, sensory understanding and insight. Engagement through art stratagems can be powerful forces to find new ways of understanding that confound dichotomization and honour the idea of continuum.

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2. I am grateful to Dr. Lorrie Boucher for this insight.
3. N. Katherine Hayles, *How we became posthuman: virtual bodies in cybernetics, literature, and informatics* (Chicago: The University of Chicago Press, 1999).
4. W.J.T. Mitchell, *What do pictures want? the lives and loves of images* (Chicago: The University of Chicago Press, 2005), 2.
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6. Robert Alan Brookey and Kristopher L. Cannon, "Sex Lives in Second Life," in *Critical Studies in Media Communication* Vol. 26, No. 2 (2009): 146.
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MEDIATED EARTHWORKS: NEW MEDIA GOES WILD

SCOTT HESSELS

The artistic use of emerging sensor technologies in remote locations is resulting in artworks inextricably linked to dynamic forces in the natural landscape. Like Earthworks, these projects are shaped by nature, connected interactively with their environments but using technology instead of bulldozers to mediate. New media is introducing new types of environmental impact in sculptural, visual, cinematic, and narrative construction.



Fig. 1. Sustainable Cinema No. 1: The Image Mill, 2009, Scott Hessels, steel kinetic sculpture, installed at the Ford Presidential Museum, Michigan. Copyright Scott Hessels.



Fig. 2. Mulholland Drive, 2004, Scott Hessels, Michael Chu, Martin Bonadeo, light and sound installation, installed at UCLA, Los Angeles. Copyright Scott Hessels.

Throughout history, artists have taken the materials and forces of nature and used them in the creation of works. The sculpting of clay, the mixing of pigments both represent the use of natural or organic materials as servants to artistic inspiration. However, a subset of art has allowed that relationship to be reversed. Using a wide range of tools – wind, entropy, erosion, mapping – some artworks allow nature to be a physical, determining influence in their realization. These artists have shared their vision with the natural environment and transferred the power to shape its form to the forces of nature.

Recently, new media artists have joined this tradition and begun using data from the natural world as a driver for visual, temporal, narrative or dimensional components of their work. Taking advantage of the increasingly portability of computational sensors, these artists are ‘reading’ the natural environment and then using the data to shape artworks that exist in a mediated but symbiotic relationship with the natural world.

Easily understood as a type of data visualization, the projects often focus on the computational and can be associated with other information arts. Alternatively, they can be viewed as ecological art, tapping into the contemporary zeitgeist surrounding sustainable design. However, if one considers the interactivity of the works – nature as a collaborator – they fall rather interestingly into a history of Land Art sculpture. Perhaps by viewing these projects as Mediated Earthworks, we broaden both the depth of these artworks and our understanding of our complex relationship with nature.

The moving image is usually considered a mediated art form since it is difficult to separate kinesis from the machines that power it. However, kinetic sculpture is also time-based, often narrative, and its changes in shape, color, and even materiality share many qualities with cinema. Making this leap, one can consider the evolving form of Calder’s mobiles and the rambling wind-powered sculptures of Theo Jansen as non-mediated moving images. In a sense, kinetic artworks are screenless cinema.

The Earthworks sculptures that began emerging in the 1960’s were often sets of instructions that foreshadowed programming as well as made to change over time. Their innate ephemeral qualities – artworks that embraced entropy and change instead of battling it – made them temporal forms whose changing ‘image’ was part of the artists’ creative strategies. As sculptor Robert Morris explained, “What art now has in its hands is mutable stuff which need not arrive at a point of being finalized with respect to time or space. The notion that work is an irreversible process ending in a static icon-object no longer has much relevance.” [1] The sculptures had cycles, changing stages, life spans. Earthworks were images that moved.

Like the moving image, interactivity is also strongly associated with computation and media. However, interactivity can be purely relational, with no mediation required. Paul Willemsen puts it almost bitterly, “To refer to interactivity as a new feature characteristic of ‘new tech’ discursive forms is, again, nonsense. Indeed, in many respects, the digitalization of information has rendered interaction between reader/viewer and text-production more restricted in that the protocols governing interactivity have become tighter, narrower, more inflexible, and more policed. The expansion of opportunities for interaction has become accompanied by reductions in the scope for action.” [2] Part of that scope of action is limited by a view that interactivity must occur with machines.

However, interactivity may not be limited to Willemsen’s reader/viewer either. The emphasis on process and temporality of Land Art was directly tied to forces in the environment. It was a unique and radical form of interactivity, where context was given influence and power, forming a triangle to the reader/viewer relationship. The artist interacted with the natural environment, viewers interacted with the spaces and systems that were created, and nature would interact with the sculpture by reshaping it. Artist, viewer and nature were in a messy mix of interactivity...which wonderfully increased the unpredictability of each of the interactions.

This emphasis on time and process allowed viewers to look at the dynamics of the elements in the environment. One had to experience different stages of the system to experience the whole work. The physical forces of the landscape became an interactive driver for the realization of the visual artwork. It was

“a programmatic approach to the work and advocates sculpture which experiences, reacts to its environment, changes, is non-stable... art is gradually entering into a more significant relationship with the viewer and the component parts of his environment.” [3]

Changes in time led to changes in form and the Earthworks movement viewed sculpture as malleable, changing, entropic, and participatory. Earthworks connected physically with their environments and were designed to react to the forces found there. Nature was the hammer that pounded the sculptures, the brush that changed their colors. “During the period, many artists worked with natural materials, often fascinated by their evolution and their organic decomposition. To better observe this process, the artist became almost a laboratory assistant, engaging in artistic experiences.” [4]

Many of the Earthworks artists would probably contend that they were fighting the creeping technology and mediation of the 1960's and took to the desert for its innate isolation and primitivism. It is ironic that many of the works were actually very complex systems and, when connected with the programmatic strategies evolving in Conceptualism and Fluxus, became keystones in the computational arts of today.

These artistic systems are celebrated as early ecological art but could easily be equally lauded as early programming art. Hans Haacke creating artificial ecosystems (“Rhine Water Purification Plant” 1972), Agnes Denes harvesting wheat in downtown Manhattan (“Wheatfield: A Confrontation” 1982), and Robert Smithson pouring tar down an eroded hillside (“Asphalt Rundown” 1969) all leaned on nature to do the heavy lifting and provide the meaning. The sculptures could not exist without the input of nature itself. The direct use of forces and processes in nature to create sculpture continues today. John Grade’s “Host” (2007) is partly sculpted by the local birds pecking away at the form of his work.

Today culture has shifted towards an emphasis on sustainability – how those ecological systems can continue on. It is an approach that empowers natural systems, giving them the capacity to endure. Sustainable design often incorporates a direct agency with environmental power – wind, currents, sunlight, etc. The highlighting of systems in nature has been replaced by a closer look at the forces of nature.

Tapping those forces means that artistic gestures can be shared with nature itself. Kinetic art has often recognized this possibility and used natural force as a method to change the form of a sculpture. Alexander Calder’s mobiles opened up sculpture to the dynamics of outside influences, for example. Two recent exhibitions of kinetic works have emphasized the forces of nature as a collaborator in the creation of an artwork. Guy Brett, curator of the Force Fields: Phases of the Kinetic show in Barcelona, explained that “we begin to see that ‘natural phenomenon’ and ‘aesthetic decision’ were at this time in a shifting and reciprocal relationship to one another. The working-out of natural processes was allowed to change the conception of the beautiful; artists ceded their ‘will to form’ to certain degrees and in certain ways, and allowed natural events to prevail, which was seen as an emancipatory process, and to offer deeper insight into reality.” [5]

The Drip, Blow, Burn: Forces of Nature in Contemporary Art exhibition at the Hudson River Museum presented artworks that used wind, water, and fire to shape the materials of the art. Curator Thomas Weaver observed that “the natural here is not just a subject, and certainly not just a material...moving natural elements are *primal* elements that, by rupturing the boundaries that govern the significations of visual art, embody the power of art to wrestle with the world.” [6]

Although wind, water and fire are dynamic forces to use as creative influences, they are just the beginning of the possibilities. Computer technologies have not increased the distance between man and nature, new sensors have actually introduced new types of environmental agency. Many natural forces are not directly tangible and now the invisible energy fields, patterns, rhythms and dynamics of nature are possible artistic 'shared gestures'.

Today, indiscernible changes in motion, light, sound, temperature, depth, and a host of other variables can be detected. Our newfound computational detail is spreading and giving us unique information about the natural environment. One of the largest initiatives, Hewlett-Packard's "Central Nervous System for the Earth," plans to release a trillion sensors into the natural and built environments. [7] Tiny wireless contraptions will swarm the planet giving real-time information on ecological systems, geological activity, energy waste, *etc.* We can now discover new types of kinesis in our environment.

Increasingly, artists are co-opting these stunning data streams for artworks. When the sensors are matched with timespans, data over time, we see the increased possibilities of nature itself affecting an artwork. Similar conceptually to Earthworks, these new computational versions have a key difference. Mediation is not limited to the photographic or video documentation of the artwork but now includes the actual collection and input of artistic materials. Media is no longer just presentational.

With sensor and datastream as a type of mediation, emerging technologies make it possible to create new media artworks in remote, wilderness locations. The miniaturization, portability, and cheapness of sensors, computers, projectors, *etc.* is leading to a body of work where the landscape is inextricably linked to the artwork. The list of sensing technologies is growing at a phenomenal rate; this includes commonly used sensors like GPS, DNA, motion, altitude, tilt, speed, light, sound, SONAR as well as emerging technologies in 3D/stereoscopy, 360 degree cameras among others. When matched with artistic strategies, we're seeing GPS Drawing, light and sound installations, projections, and a host of other technologies all using captured datasets that transform the artwork in real time as the data from nature is incorporated.

The narrative possibilities are also being explored when nature is used as a driver for story construction. The natural environment can now become a protagonist, not metaphorically but literally, in the evolution of a story. Sensed changes in nature can be used to select and present from databases of a wide range of media, creating real-time stories in text, moving image, sound, *etc.* One of the lures of exploring environmental agency is the hidden interactivity of the process. The narrative still allows for interactivity's flexibility, but is not controlled by direct human interface. Tomorrow's auteurs may be dynamic spaces.

The direct agency of the natural environment has been investigated by several artists. Mary Lucier's "Dawn Burn" (1975) used a video camera to record the rising sun until its rays left a scar on the image and eventually destroyed the camera's tubes – the power of sunlight directly shaped the visuals on screen. The Center for Land Use Interpretation (1994, ongoing) has initiated several projects that merge database arts with a proactive nature and have made advances in the art of mapping. Paula Poole and Brett Stalbaum have mixed painting technologies with GPS systems, and Haruki Nishijima has designed systems that capture ambient sound and translate it into light and motion. Sheldon Brown's "Video Wind Chimes" (1994) used wind sensors housed in streetlights that had been converted into projectors. Changes in wind changed the television channels being projected down onto the sidewalk.

In my own practice, I have also been working with the forces of nature. The “Sustainable Cinema” series (2009, ongoing) are kinetic public sculptures that use natural energy – wind, water – to generate the moving image [Fig. 1]. The artworks combine references to both the optical illusion toys that led to the invention of movies and early natural energy sources. By referencing the histories of both film and industrialization, these sculptures are simple illusions created with simple energy to make us reflect on how removed we are from the original magic of the moving image. It is a primal media experience, which due to the rapid development of cinema technologies, is no longer an oxymoron.

I had explored this direct agency of nature years earlier when I created a light installation based on the topography of Los Angeles’ famous Mulholland Drive. Together with programming by Michael Chu and sound design by Martin Bonadeo, we collected the tilt, altitude, location, direction, speed and sound of the drive and created an exact duplicate of the experience of traveling along the road in a 3D computer program. That virtual path was then used to control two robotic lights in a dark room filled with fog. Like cinema, direct data is captured, then edited and presented. However, here the environment directly defines the experience, the precise geography is used computationally. “Mulholland Drive” [Fig. 2] demonstrates how the rhythms, patterns, and random chance of the environment can be sensed through new media technologies and used to create new forms of visual experience.

Computational sensing, database aesthetics, real-time processing and visualization systems all can give new perspective on the natural environment. Working with science, media artists can now use the same materials that shaped the Earthworks movement like water, air, soil, stone, temperature, light, acoustics, topology, geography. However, with sensing, shared creative input can be given to natural forces and phenomena in those materials – flow, echo, wind, currents, reflection, decay, animal migration and behavior, topology, projection, and so on.

Once again, artists are reflecting society’s views on the environment but now with an emphasis on shared input – natural energy paired with creative energy. With emerging sensing technologies, hidden natural forces can also be used in artistic strategies. For centuries, nature has been celebrated as an inspiration for the arts. Finally, nature can do more than inspire, it can pick up the brush itself.

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MEANINGFUL LANDSCAPES: SPATIAL NARRATIVE, PILGRIMAGE AND LOCATION BASED MEDIA

Megan Heyward

A range of locative projects involve navigating landscapes augmented with social or historical meaning. In what ways do they echo and intersect with older cultural practices involving spatial narrative and the walking of a meaningful landscape – the practice of pilgrimage? This paper explores pilgrimage as a form of spatial narrative, and the ways in which earlier notions of walking a meaningful landscape might inform location based practices.



Fig 1. View from Yakuoji Temple, 88 Temple Pilgrimage, Shikoku, Japan, September 2008. Photograph, Megan Heyward.



Fig 2. Stations of the Cross crucifixion scene on Sydney Harbour, WYD08, Millers Point, Sydney, July 2008. Video still, Megan Heyward.

Over the last decade, developments in GPS and location mapping technologies have led to the emergence of many location based and spatial positioning applications, alongside a diverse range of artistic projects that work creatively with GPS data. While locative artwork and practice is a broad area, many projects can be categorised, according to Tuters and Varnelis, under one of two mapping approaches, “annotative – virtually tagging the world – or phenomenological – tracing the action of the subject in the

world." [1]

Many annotative locative media artworks involve navigating landscapes layered or augmented with personal, social or historical meaning. These include the placebased storytelling of Jeremy Hight, the *Murmur Project*, *Yellow Arrow*, *Knife and Fork* and many others, all of which affirm Hight's sense of "agitated space", of space "alive with unseen history, stories, layers." [2]

With the recent widespread rollout of 3G networks and the availability of powerful, domestic mobile devices, there has been a renewed interest in the application of location based approaches across a range of cultural contexts, particularly through annotating locations with archival images, texts, oral histories or other materials by the museum and cultural sectors. As cultural institutions increasingly move into locational spaces, and as location related tools, apps and devices become more accessible, it seems relevant to explore some of the ways in which augmented, meaningful landscapes have been a critical element in a much older cultural practice – the practice of pilgrimage.

In her 2005 article "On Spatial Perception," Nina Czegledy brought attention to the resonances between certain religious practices and augmented reality. Describing the sight of Buddhists simultaneously walking, circling stupa and praying in sacred sites in Lhasa, Tibet, she wrote, "While walking and praying in the yak-butter-lit, mystical space, the pilgrims appeared transported into an enhanced, symbolic world – an augmented reality." [3]

In this paper, I wish to explore some of the echoes and resonances between certain contemporary location based media practices and older cultural practices involving spatial narrative, annotated or augmented location and the walking of a meaningful landscape – the practice of pilgrimage. In what ways might an examination and understanding of pilgrimage practices inform our approaches to developing place-based storytelling experiences? And whilst I will focus here on some areas of commonality, I acknowledge that there are many areas of divergence. However, I'd like to explore some of these resonances; as a way of exploring how experiences of landscape, narrative and embodiment in pilgrimage practices might inform contemporary media practices concerning location, in particular place-based storytelling and spatial narrative.

PILGRIMAGE AND SPATIAL NARRATIVE

What exactly is pilgrimage? We might think of it primarily as a religious practice involving a journey of spiritual or moral significance to a specific location or set of locations that have been designated as sacred or otherwise meaningful. Originally referring to the European Christian practice of visiting specific sites associated with the life of Jesus or Christian saints, pilgrimage now commonly refers to particular meaningful practices that are present across many cultures and religions. These include Islamic journeying to Mecca, or Hindu and Buddhist pilgrimage to locations such as Kumbh Mela in India or Mt Kailash in Tibet. [4]

In contemporary culture; the word 'pilgrimage' is increasingly used colloquially to refer to meaningful, secular journeys to landscapes of particular personal, cultural or historical meaning. For example, the journeys of contemporary Australians to Gallipoli, in the Canakkale province of Turkey coinciding with ANZAC Day on April 26, are routinely described in the Australian media as 'pilgrimage'. Visitors are said to have made the pilgrimage to Gallipoli without any hint of irony or religious overtone.

Pilgrimage – both religious and secular – can be seen as both a form of spatialised narrative and as an annotative practice whereby specific locations are associated with narrative and meaning. Further, it is an embodied practice involving both an intellectual engagement with the stories associated with place; as well as an active journey and making sense of landscape and environment as it is experienced.

In “Wanderlust: A History of Walking”, Rebecca Solnit writes extensively on pilgrimage, as well as the contemplative nature of walking. Drawing links between geographic and spiritual terrains, she writes, “Pilgrimage is based on the idea that the sacred is not entirely immaterial, but that there is a geography of spiritual power.” [5]

There are numerous examples of the use of spatial narrative in traditional pilgrimage practices; notably the spatialised Christian crucifixion narrative known as the Way of the Cross or Stations of the Cross. In its early incarnations, 14th Century Christian pilgrims visited Jerusalem to retrace the final journey of Christ, walking the same ground, and often returning home with relics and artefacts. During the 16th Century, Franciscan’s built outdoor shrine replicas of the Stations In France, often incorporating the Jerusalem relics; and by the late 1600’s permission had been gained to build the Stations inside Catholic churches.

The Stations of the Cross involves a complex layering of landscape, narrative and walked, embodied experience. In Jerusalem, it traces or augments the landscape with Christian narrative – “landscape became text, and text was engraved into the landscape as pilgrimage.” [6] As the Stations journey is then reproduced and distributed into local churches, further degrees of complexity are involved – an abstracted representation of a journey; a virtualisation of real world locations; and the superimposition of a complex narrative onto a small number (fourteen) of signifying images. If we were looking for an historic antecedent to contemporary place based storytelling practices; the Stations of the Cross may be a significant example, involving “stories we can walk into to inhabit bodily, stories we can trace with our feet as well as our eyes.” [7]

Contemporary Christians continue to experience the Stations in several forms, including as a large-scale spatial narrative. On July 18, 2008, the Stations of the Cross was re-enacted on the urban landscape of Sydney during the Christian World Youth Day Summit. During this event, Sydneysiders saw key Sydney locations effectively overwritten with Christian narrative – the Botanic Garden’s transformed into the garden of Gethsemane; the Opera House into a torture site; and an ex-industrial wharf into the crucifixion site. Unlike the more traditional Stations experience, this re-enactment was not a walked experience, since large audience numbers made it impossible to shift people safely around Sydney within the timeframe. Instead it was a broadcast event; taking place in sequential, discrete locations, and reliant on simultaneous live media broadcast of location-specific narrative via large public screens.

The juxtaposition of the Sydney Harbour environment, including the utilisation of iconic, contemporary sites such as the Opera House, with a two thousand year old narrative that was effectively superimposed on the landscape, was, I believe, problematic, and at times distinctly uncomfortable. Although this may seem an extreme example; such an approach, which overwrites a location with an entirely unrelated narrative, is also deeply at odds with the location specific narratives and histories evident within many contemporary location based works; and to be fair, with the Jerusalem based Way of the Cross. Regardless of religious leaning, the problem of disjunct between narrative and place is an important issue to consider. Rather than superimposing upon location, it may be more effective to maximise the relationship between narrative and location.

SHIKOKU LANDSCAPE AND LAYERED MEANINGS

By way of contrast, I will turn to spatial narrative within a non-Christian context, focussing on the 88 Temple Buddhist pilgrimage in Shikoku, Japan. The pilgrimage is Japan's most popular Buddhist pilgrimage route, attracting thousands of 'henro' [8] or pilgrims each year to the island of Shikoku, in southwest Japan. Looping for over one thousand kilometres around the Shikoku coastline, and involving 88 temple loci; the pilgrimage is undertaken by car, bus, and still, at times, in its original mode, on foot. The pilgrimage relates to temples founded or restored by the famous Japanese monk Kukai, known posthumously as Kobo Daishi, a Shikoku native and significant historical figure in Japanese culture; being the founder of Shingon Buddhism in Japan, the founder of Koyasan on Mt Koya, and a renowned writer and poet.

Unlike many pilgrimages, the Shikoku pilgrimage is not seen as a strictly linear journey that culminates in arrival at one especially sacred place; rather it is structured as a looping, circular journey, where all eighty-eight locations are seemingly of equal importance. Unusually, it is a pilgrimage that can be undertaken discontinuously – one can begin the pilgrimage one year, undertake a portion of it, then return quite legitimately at any time, even years later, to pick up from where you left off.

There are several intertwined levels through which landscape and narrative are creatively aligned within the Shikoku pilgrimage. At one level, the circular nature of the route allows the Shikoku pilgrimage to operate as a type of sacred mandala; with the journey through the four island prefectures and to its temples roughly corresponding with the four stages of Buddhist enlightenment. [9] This is referred to in several texts and maps concerning the pilgrimage, dating back to the 18th century. Academic Ian Reader, who has written extensively on the Shikoku pilgrimage, writes, "The pilgrim's journey, therefore, is one that follows a path to enlightenment in which Kobo Daishi is both a companion and guide in the pilgrimage, while the island is envisioned as a sacred terrain, mandala and map of enlightenment." [10]

At another level, locations within the pilgrimage are associated with stories and acts concerning Kukai. Born in 874, Kukai is known to have undertaken solo journeys and austerities around Shikoku; notably to Mt Tairyu and Cape Muroto, where he had profound experiences that he later wrote about. Over time, through a blurring of the historical and the fictional, various legends or miraculous deeds have been associated with Kukai's presence or actions in particular locations on Shikoku. These real and imaginary stories – he carved a statue here, bringing life to the landscape; or he struck his staff on the ground there, causing a stream to emerge – have become part of the multilayered narrative concerning both the pilgrimage, and the island itself.

The Shikoku pilgrimage resonates strongly with Hight's notion of landscape agitated with unseen histories; where narrative is in a sense traced or carved onto the island through storytelling and association over several centuries, as well as through the embodied practice of walking. Ian Reader speaks of Shikoku as a moving text that is shaped and reshaped by the interweaving of historical and legendary narratives alongside contemporary pilgrimage experiences on Shikoku.

"In Shikoku, for example, there is evident correlation between the physical landscape and sacred narratives, in which the sites and settings of the henro are locations richly layered with complex weavings of meaning and textual representation. This richness of meaning inherent in the locales of pilgrimage provides a moving text for the pilgrimage, and allows scope for different participants to pursue their agen-

das and follow their own pilgrimage paths, which are themselves influenced by the settings and landscapes in which they are enacted.” [11]

At a third level, the Shikoku pilgrimage employs a device that actively and creatively links landscape and narrative through the use of ‘goeika,’ [12] which are poetic, haiku-like instructions or hymns. Each of Shikoku's 88 temples has a discrete goeika, commonly referring to the temple and the landscape or nature surrounding it, and posing Buddhist philosophical questions or instructions to the person undertaking the pilgrimage. Written in an arcane poetic structure, very few have been translated into English, however, those that have often refer to elements of the natural landscape such as the scent of wisteria, the fading of maple leaves, or the golden colour of water in a nearby pond. Posited often in the second person, present tense, they invite the pilgrim – and here I really want to say the word “participant” – inside the narrative; inside the island’s text or sacred mandala; exhorting them to engage with the landscape before their eyes; experiencing it not just as a map of historical narratives and miraculous deeds, but participating intimately in the environment freshly, as it arises. In effect, the goeika act to mediate the environment, providing a filter through which to experience the temples and surrounding landscape.

At Ichinomiya
Prayer is not easy
Roll up your sleeves as you pray
Seeking comfort in this world.

Autumn maple leaves
Scarlet or faded, perish.
Once more, springtime comes again
Unending and forever,
Death follows birth, birth follows death. [13]

These complex, intertwined relationships between landscape and narrative in Shikoku appear to indicate unexpected and intriguing correspondences with a range of contemporary location based and augmented reality practices. The Shikoku pilgrimage operates as a spatial practice; and the concept of the island as mandala supports the sense that the pilgrimage operates as a large-scale spatial narrative. The correlation of various sites with specific location-related narratives sees the pilgrimage operating as an annotative place-based narrative – a landscape augmented and overwritten with narrative, myth and miraculous acts. And the utilisation of the goeika within the pilgrimage indicates a further degree of complexity in the relationship of landscape and narrative. Through the use of a second person, present tense and the referencing of actual features of landscape and geography, the goeika act as triggers for a complex ongoing questioning and engagement with Buddhist thought in the context of the locations themselves.

As such, this multilayered relationship between landscape and narrative in Shikoku seems to facilitate an active engagement with location, and a somewhat reflexive, intimate dialogue between the past and the present; rather than representing a purely rigid set of concepts or histories that are tied to place. The potency of such an approach, where there is an intimate, fluid dialogue between the landscape, narrative, and participant can arguably also be seen in the work of various contemporary artists working with location; for example Blast Theory, Teri Rueb and Janet Cardiff, among others.

Over the last eighteen months, there has been a steep rise in the uptake of smartphones in many countries, at the same time as an increase in the application of location-based technologies within museum and other cultural contexts. Mobile applications such as Layar and Junaio easily support virtual annotation of the environment, however, issues of engagement and motivation can be problematic for both practitioners and audiences. While some services, such as FourSquare and SCVNGR, utilise challenge and reward models to maximise audience participation, these approaches are not always suited to historical or artistic location based projects.

As we work with annotative approaches to location-based media – as artists, historians or cultural workers – we face multiple challenges. Why should people engage with these projects? How do we keep people engaged in walked, location based experiences that are not necessarily treasure hunts, or do not offer obvious real world benefits or rewards? If we consider pilgrimage as an historic spatial practice involving the augmentation of landscape with narrative, histories and meaning – and additionally, one that continues to engage people in complex conceptual and physical journeys – what aspects of pilgrimage practice, might be useful to consider? It seems that the most potent, relevant areas to explore involve the experience of an augmented landscape which fosters an intimate, fluid and immediate dialogue between landscape, narrative, and participant; between past, present and possible futures; or between multiple narratives, ideas and histories. Such approaches are likely to involve strong resonances between landscape and narrative; however, these suggest neither a rigid, closed set of stories, nor an unrelated, superimposed narrative or re-enactment, but rather an active, intimate engagement with landscapes traced with multiple ideas and concepts; and with complex sets of meaning.

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IT'S BEHIND YOU: THE PARAMETERS AND PROCESS IN THE CREATION AND PRESENTATION OF PANORAMIC MOVING IMAGES

DAVID HILTON

During September 2010 ICCI (Innovation for the Creative and Cultural Industries) University of Plymouth, UK, organised a 360 film, arts and performance festival in Plymouth city centre. Using the festival as a case study, this paper reflects on the parameters for and the processes involved in the preparation of creative content for the festival, particularly focusing on the issues and concerns pertinent to 360 film making.

During September 2010, ICCI (Innovation for the Creative and Cultural Industries) and the University of Plymouth, UK, organised a 360 degree video film, arts and performance festival in Plymouth city centre. The rationale behind this festival was to revive and re-engage with the popular nineteenth century tradition of touring panoramas.

Drawing on this traditional context, the ICCI festival also aimed to investigate the potential of panoramic spectatorship, utilising new innovative technologies of a projection screen format of six metres by twenty metres in diameter, high quality digital HD projection, digital surround audio and a performance space/auditorium housed within a demountable dome structure

The concept of the festival had been developed in line with the aspirations of LOCOG 2012 Cultural Olympiad in the South West of England; exploring the potential of a touring venue for the display of media and performance content. Using the festival as a case study, this paper reflects on some of the parameters and criteria established for the preparation of creative content for presentation within the Arena, particularly focusing on the issues and concerns pertinent to 360 degree film making. To do this we will review the display and presentation of film within the festival's 360 degree auditorium from three key aspects. First, we will reflect on factors that relate to the audience experience of panoramic content. Second, we will discuss how particular spatial and visual environments effect both the production and experience of presented work. And third, we will look at how these factors might be understood within a particular context.

As a result of the growth in panoramic photography [1] and recent developments in 360 degree video [2] there have been an increasing number of practitioners internationally who have been exploring this format as a creative environment. However, until recently the majority of the work produced has been limited: content has usually been displayed as interactive panoramas for computer screens, employing a computer mouse or touchpad as a means to navigate a 360 degree photographic or video space that is normally presented as a spherically mapped environment on a single screen. An emphasis for the festival was placed on the presentation of panoramic photographic imagery and video filmmaking rather than computer CGI animation, although examples of all methods were displayed.

The primary position for viewing the 360 degree image is from the centre of the auditorium. For the filmmaker and the film editor, this geographical positioning of the audience is both exciting while at the same time potentially problematic. The excitement emerges from the prospect of being able to place the viewer within the action - a step closer to Borger's map, [3] the replication of reality that might be

considered a holy grail for certain artists, particularly those filmmakers seeking to comment on, experiment with and play within what is real and its representation.

A simple and perhaps obvious notion is that the image is surrounding the viewer in a way similar to the viewer's experience of 'real life' and therefore the 360 degree experience could be considered to be more realistic than other methods. This concept of immersion is perhaps where the audience position becomes problematised, in that the viewer in real, not filmic, life is perceived not as being immersed in something but participating in an experience of the world from a particular place at a particular time. Immersion within a constrained environment, be it the virtual environment of a screen or screen goggles or the more geographical positioning within an enclosing visual environment like the 360 degree dome, is not the same as the more everyday experience of 'reality.' The constraint is the frame within which the experience purports to offer a new experience or perhaps understanding. A principal paradigm of film viewing and editing is the position of the viewer in relation to the screen, which is determined by the viewer's location in the arena and the direction they are looking; there is always a front and back to the screen area (although, during the ICCI 360 Festival some viewers were pressed against the wall, to gain better visibility or view of the whole screen). From this position the viewers witnessed distortion that mitigates the illusion generated by the 360 degree image. The geographical position of the audience determines their perception of the illusion; ideally they need to occupy the central space of the auditorium for optimal viewing experience. Inevitably this limits the audience members who have an optimal experience, as central auditorium space is limited no matter how large the auditorium.

Deriving perhaps from the proscenium arch of the theatre, we look into screens as we look into a book to read. Early panoramic paintings relied heavily on the inclusion of architectural structures, either 'faux terrain' or painted, to frame the images they depicted. The frame afforded by the screens represents a single field or point of focus and for the most part this is taken for granted in viewing. One of the most dramatic adjustments that needs to be considered when producing - or for that matter experiencing - 360 degree cinema, is the idea that, although one is working with a much wider frame, the viewer is not able to see and experience everything at any one time. While, particularly for a standing audience, there is the opportunity to move one's eyes, head and body to experience the complete screen, the viewer, schooled for many years of image consumption through various sizes of flat screens and by every filmic example previously experienced, holds onto single screen mentality and may struggle to reduce the screen horizon into a watchable frame. Unfortunately, in doing so elements of the presentation may go unseen behind the viewer.

This 360 degree horizon within which the audience is placed seemingly has the potential to offer unlimited opportunity to encapsulate a scene, an environment or a moment in time. In the natural landscape, our perception of the horizon is most usually associated with an unlimited field of vision. We might experience awe in landscape vistas, perhaps due in part to the prospect of infinity, outside of and beyond where we are standing. Other factors possibly mitigate against a similar perception within the Arena. For example due to the organisational constraints, the base of the viewing screen within the 20 metre diameter structure was placed 2 metres above ground level; the top of the screen was therefore 8 metres above head height. Our evaluation of this configuration determined that the screen required the audience to continuously look up to experience an on screen display. During the previous tests, conducted in a smaller 12.5 metre diameter structure the screen base was 1.4 metres above ground level with a 3 metre high screen terminating 4.4 metres above ground. The lower screen configuration and perhaps the smaller space provided an improved sense of being immersed within the film or photographic environment. With the larger diameter screen, the experience of gazing at panoramic views of the sort al-

cluded to above, one was not awe-struck in the same way since their promise of infinity was quite pragmatically restricted to the geography of the structure, the horizon of which ends with the screen. Yet an idea or expectation of unrestricted horizon is built into the idea of the 360 degree image. This duality of ideas and experience is an interesting and unexpected conundrum of the 360 degree processes. The Projection within the 360 Arena offers a sense of an immersive experience but is also a framework for construction of that experience - the viewer has work to do.

It might be said that an important function of the relationship between viewer and screen in cinema is the viewers' anticipation and expectation of 'what next.' The events that are unravelling on screen presuppose a series, with one event or situation replacing another. As viewers we are in a state of expectation that will be relieved by the appearance of 'what next,' but this relief is immediately replaced by a new 'what next.' What if the 'what next' might be happening behind you? What if the 'what' also brought with it a question of 'where?' What if it were possible to have protagonists between scenes appear at different parts of the auditorium, within the horizon of the 360 degree screen?

In allowing for the illusion of placing the viewer within the geography of the action, the filmmaker has also to consider the time it might take the viewer to shift position to see something happening behind them. To an extent the filmmaker has lost control of the framed image and cannot predetermine the focus of the viewer's attention. In this respect, the production and editing of a 360 degree work allows for new ideas in editing that perhaps use things the viewer can see; such as movement, colour and contrast. And in addition to this, devices the viewer cannot see (but might hear). Teasing, perhaps. Does the video editor allow for a time lag in cuts/transitions so the viewer might adjust their viewing position, or run the risk of the viewer missing parts of the action? Should a shift in action and visual focus around the 360 degree screen be signalled, indicated or aided perhaps by a shift in sound – particularly if one is working with surround sound?

The editing of all film and animation for the festival took place using a five screen linear format in preparation for the five-projector display method that was employed in the 360 Arena. This was not an ideal solution; inevitably screen three became the centre screen for editing purposes with screens one and five (which in projection would be joined) at opposing ends. The consequence of this linear format highlighted a number of interesting editorial issues. There was great pressure for screen three, due to its central position to become the focus for editorial decisions particularly those based upon visual composition. The natural and human desire for symmetry during the editorial process became a factor that had to be consciously overcome if the link between screens one and five was not to appear disjointed and the images were to retain the benefits of a 360 degree layout. A number of the works composed of still images used the stitch process of blending a number of images to produce a whole panorama. This stitch effect was also used in a montage way by a number of filmmakers as they compiled a number of different images to produce a whole composite. An example of this would be; "Cortical Songs," movements one & two, by John Matthias and Nick Ryan, (Matthias and Ryan 2008) performed by the String Ensemble of Trinity College of Music, conducted by Nick Pendelberry. [4] This 360 projection piece constructed by the co-author David Hilton was made up of single camera recordings that were edited onto 5 separate screens to remain in sync with the music. The effect was successful, largely due to the splendid camera work of Robin Cox directed by Andrew Graham Brown, which deployed balletic craning and tracking camera motions. Perhaps because the orchestra was not seen in the round there was no single geographical centre for an audience member to experience the film, instead he/she was able to access the separate screens within any part of the circular screen that was visible to them. The structuring of the work started with all screens showing the same image repeated, following the expectations associated with viewing a single screen. Gradually different images or camera views were introduced on

separate screens. As the work progressed, each screen would present a different view of the performance with close ups on performers from different parts of the orchestra. In this way, the editing worked with a narrative both of the progression of the musical piece and the audience's engagement with it. Gradually, the audiences were encouraged to see what might be happening behind them and make full use of the 360 degree environment. [5]

The Ladybug 3, [6] 360 degree video camera was used for a number of productions presented within the ICCI 360 arena. This device captures video using six cameras: five around the horizon and one above to produce 80% of a hemispherical image. Within the ICCI Arena, only a cylindrical slice of this image was used for projection on the wrap around screen, the screen did not extend to the full dome ceiling. The Ladybug 3 offered the obvious choice for film that recorded full 360 degree panoramic video imagery. Only a few of the works used the Ladybug 3 as the sole source of imagery. Perhaps the most effective use of the camera was in the production of *Panoptica* by Craig Whyte, Andy Banks and Jo Plant. In this work, the producers combined live action single camera shots with live action shots using the Ladybug camera and C.G.I. effects and environments within which the protagonists of this science fiction film interacted.

The ICCI 360 screen marries both theatre and cinema and creates an entirely new experience. In conceiving the 360 film. I first thought about early cinema, largely due to the technical limitations the 360 Ladybug 3 camera created. For instance, in early films such as those created by the Lumiere brothers, all the action took place within one static shot with few cuts. In this sense, shooting on the Ladybug is the same. But it also connects the medium once again with theatre. The camera becomes the audience and the actors perform their roles within a single space. In this case, you're working on a 360 stage. [7]

The conceptualisation of the space when planning action within the 360 arena also presents problems with the design and construction of the work due to the fact that one cannot see it as it will appear, except in the 360 environment.

The best way to do it was by doing a floor plan - a bird's eye shot to see how we use the space using the 360 camera - I don't think we would have been able to do it without the plan.

There were certain scenes that worked in the film – for example the ventilator scene, that was a bit surprising, you have the main character who has escaped and ends up in this vent shaft and when you watch it as a single screen it is quite boring - but we were quite surprised watching it back in the 360 how interesting it was because he was going all the way round the 360 degree screen crawling in that space and that is the first time the audience actually get to just to see that main character. [8]

The process of production is not automated and no matter how inventive in its conception each work was the result of painstaking production processes. The degree of detailed work involved in production is perhaps exemplified by Udo Hudemaier's piece *City of Plymouth* produced entirely using still images. Each image underwent a high degree of processing; particularly evident in the shifting of perspective as each window of a high rise office was seen square-on without perspective distortion while its setting flew up and down the buildings, an effect produced by photo manipulation one frame at a time. Other producers had different problems but each had to devise a strategy for maintaining alignment of individual images to create the synchronous whole image on projection. Perhaps two methods most used were to assemble the whole 10:1 ratio panoramic image in a programme such as Adobe's "After

Effects,” necessitating use of the flat one screen image to represent the enclosing panorama. Another method was to fragment the sections of panoramic images into five single screens, which then were augmented with other footage and effects – one screen at a time. In this latter method the sense of the wrap-around panoramic image or ‘suggestive image space’ of the work was more difficult to sense during the edit. [9] In all cases the only time the work was seen in its intended form was during the exhibition inside the dome.

CONCLUSION

The experience of preparing creative works for projection within the ICCI360 Arena has raised many subjects for further research. In this paper we have identified just a small number of these subjects and have outlined:

The large numbers of international creative practitioners who are exploring the 360 degree format are limited to the presentation of their products as navigable spherical images presented within the frame of a computer monitor. Within the computer screen one notionally has complete access to 360, but the computer screen always frames this. Whereas the frame established by the screen in the dome seems to be unframed, it is in fact the dome itself, which provides a frame: the 10:1 aspect ratio of the projected image is a very narrow window. This could be construed as a possible inhibitor of an immersive experience. The 360 degree projection environment presents further possibilities and problematics for this work.

The significance of the size of viewing space and the position and size of the viewing screen relative to the audience is an important mediating consideration. And further, the importance of viewing the 360 degree projection from the centre of the display for an optimal experience of the panoramic image necessitates a restriction in the size of audience. The scale of the immersive experience may be a factor for further exploration with regard to the 360 degree horizon and the height of screen: looking up to horizon or down upon it. [9] If the projected visual horizon is not at eye level the viewer’s ability to relate to landscape is mitigated. If the image horizon is above the viewer it is related to as a picture on the wall, but if lower than eye level, one is more likely to be immersed and encounter a feeling of presence: the viewer needs to look ‘at’ or ‘down on’ and not ‘up to’ the image.

Of the many issues in production for the 360 environment, we should identify the following as of particular concern for future exploration: In constructing action and narrative sequences that employ the full scope of the 360 degree screen one runs the risk of the audience missing parts of the action which might take place behind, where their attention is focused. Should producers allow time for the audience to change their focus and indications - perhaps using sound to suggest this? Other devices include tracking action around the 360 degree screen by isolation of certain key points of attention such as actors/figures moving or the de-focusing or blacking out of other parts of the action. Currently the editing process requiring single screens to be laid out in a line of five may lead to over use of the symmetrical structuring of screens and a focus based on screen three (which is in the centre of the edited image) and screens one and five becoming disjointed. The degree to which one might employ a full 360 panoramic image in relation to images montage - constructed of 5 single screens - also affects the experience of the work. It does seem crucial to the development of this form, that editing facilities are developed that permit visualisation of the work during editing.

The gap between what is in front and behind and the audience's focus of attention represents an opportunity to exploit and explore a conceptual space that might be described as an interpretive space, and this provides a creative opportunity for future development.

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THE METAPIANO: COMPOSING AND IMPROVISING WITH SCULPTURE

RICHARD HOADLEY

This paper concerns the implementation and control of interactive sculptural interfaces, designed to be used by the public as well as by musicians or dancers. The main device under consideration is called the Metapiano, an interface developed to trigger and modulate an array of musically expressive algorithms. The paper describes interactions with hardware and software systems and the nature of the music created.



Fig. 1. Hangings with Glyphs, 2011, Katy Price and Andrew Nightingale, Canvas/conductive paint.



Fig. 2. Metapiano, 2011, Richard Hoadley, Aluminum sheet, steel, wire, acrylic, Arduino.

1. Introduction

This paper concerns the design, implementation, demonstration and control of interactive sculptural interfaces, designed to be used by the public as well as by specialist performers, such as musicians or dancers. The main device under consideration is called the Metapiano, an interface developed to trigger and modulate an array of musically expressive algorithms using a (synthesised) piano as the primary sound source.

The paper describes the manner in which a viewer/performer interacts with hardware and software systems, examines the nature of the music created, and details how the two are related. Of particular interest is the way in which the resulting music relates to both new and more traditional forms of composition, performance and improvisation.

2. Related Work

With the advent and growth of accessible methods of physical computing, generative composition and real-time synthesis, there has been a similar expansion of interest in more practical and physical aspects of music making. That which was considered some years ago as a fringe activity for more experimental musicians and engineers (Theremin, Partch, Cage), has become increasingly mainstream and has enabled progressively more intimate collaborations between the arts.

This growth has been primarily focused on the musical interface - digitally through the graphical user interface, physically through the invention of new instruments and generatively through the development of algorithms to enhance, replicate, replace and analyse, human activity. [1, 6] Of course, analyses of human behaviour have demonstrated the complex relationships between the activities that can account for our behaviour – strategies, planning and construction – as well as our direct physical interference with the world. [10]

These developments in software have been reflected in movements in the cross-disciplinary field of physical interaction with software through hardware. The introduction of the Arduino in 2005 has been seminal in encouraging those from more creative disciplines to investigate issues of HCI and expression. The practically based work of Nic Collins, Perry Cook and O’Sullivan and Iggo is of particular importance here. [4, 5, 9]

The work of Alexander Calder and Ives Tinguely is clearly significant to the physical form of the metapiano, while its use as a musical interface adopts some ideas developed in Earle Brown’s ‘Calder Piece.’ [3]

3. Triggered, Gaggles and Wired

Triggered is a dance-music project that has been evolving since 2009. The core musical group of Tom Hall, Cheryl Frances-Hoad and Richard Hoadley was invited to collaborate with choreographer Jane Turner and her dancers in the creation of an interactive performance for the Human Computer Interaction conference held in at the Cambridge University Computer Laboratory and Microsoft Research. In an afternoon, a fifteen-minute dance-music performance was devised involving dance, physical interaction, algorithmic and human-controlled music generation and instrumental music performance. My contribution was the Gaggles ultrasonic interface. [8]

In June 2010, an extended production of *Triggered* took place at the Symposium on New Materialisms and Digital Culture at Anglia Ruskin University. This performance involved two new sculptural interfaces: *Wired* and *Gagglina*. [8] Before and after each performance the public was encouraged to investigate the devices themselves and how they are used to generate musical material.

The 2011 *Triggered* production was further developed for performance at the Kings Place in London. Both *Gaggle* and *Wired* were rebuilt using more usable, stable and dramatic forms and two new devices were built – a set of three canvas hangings painted with a variety of symbols and the *metapiano*, a metallic, Calder-esque mobile.

In order to allow the dancers movement around the devices without obstruction, they were designed to operate wirelessly, hanging from the lighting rig of the venue.

4. Hangings with Glyphs

Figure 1 shows the three hangings created by writer/poets and now artists Katy Price and Andrew Nightingale. The hangings are made of unfinished canvas and both ordinary and specially prepared conductive paint, which provides touch sensitive areas on the canvases. The panels include a variety of images referencing widely differing origins: cave paintings, modern computing symbols, antennae, etc. As music interfaces they investigate links between sound, image and meaning as well as drama and expression in performance.

During both rehearsal and performance, the dancers spent time investigating the panels and indeed, when the configurations changed slightly between rehearsal occasions, complained that this hindered their learning ‘how to play’ the hangings.

In terms of capacitive touch, this was one of the most fragile and unpredictable devices. It was particularly difficult to ensure that touching actually provoked a response (and the reverse, making sure that a response didn’t happen constantly). I suggested a few times that from my position in front of the laptops, I could trigger some events occasionally. I was surprised by the vigour with which both dancers and choreographer rejected this on the grounds that it would be ‘cheating’ and, perhaps more seriously, that it would undermine the attempts of the dancers to learn how their instruments worked.

5. Metapiano

Of all the devices mentioned here the *metapiano* is the most complex, both in terms of hardware and software. It was conceived as an experimental multifunctioning object that could be played, or operated by a variety of types of performer, including members of the public, in a variety of settings. Reflecting this, there would be a variety of performance modes, including a standard music performance mode, where a musician would perform in a fairly traditional way, using the device as a performance interface. The mode utilised in *Triggered* is different: the dancers employ the power of movement and gesture as well as the algorithmic nature of the music produced to create a hybrid performance including music, movement, drama as well as, of course, dance. Another intended, but as yet unexplored mode, involves members of the public in gallery-like environments (although they could be anywhere appropriate) interacting with the device individually or in groups, and in doing so creating their own composition

or compositions. This has happened quite successfully with the original Gaggle at events such as HCI 2009.

In these situations, what is a piece of music, or a performance, and how does it differ from sculpture, sonic or otherwise? There are many examples of algorithmic and interactive art pieces that respond to movement, touch and pressure or that simply unfold over time. [6] One of the consequences has been the generation of a certain type of music: generally ambient or highly pattern driven or stylistic. I was interested in reflecting the mood, style and intention of a traditionally structured piece of western art music. One that struck me in particular was a composition that I was fortunate enough to encounter at this time, *Lune Rouge* by Alissa Firsova. [7]

This composition (and its performance by the composer) was about as far from what one might expect from a musically generative computer programme (it wasn't to my knowledge!); this is what drew me to it. Not only was it highly expressive, it was gentle, colourful, melismatic and above all structurally satisfying. It was rich and original in its use of harmony and colour.

The metapiano, as with all devices mentioned, operates through a variety of sensors, the data from which are captured and transmitted by Arduino boards of varying configurations. The data are transmitted via Bluetooth modules to the SuperCollider audio environment, where they trigger or modulate a variety of high, medium or low-level algorithms.

One of the key sensors works through capacitive touch and is based around a 555 timer chip circuit. In addition, a force resistant sensor (FSR) was included on each of four of the leaves. A performer could both touch and squeeze a leaf and by doing this generate data for immediate sonification. When touched, the capacitive sensors send a signal to one of the digital inputs on the Arduino microprocessor board. This in turn transmitted a '1' when touched and a '0' when isolated. The FSRs (and indeed the bend sensors when implemented) output between 0-5 volts; this is sampled and given a value between 0-1023.

The lowest level algorithm is simply a SuperCollider synth, a sampled piano, which plays a single 'note' event and allows for control over particular musical parameters.

This simple event provides the basis for all higher-level algorithms. As an example, one of these generates arpeggios, imitating some of the most characteristic passages of the Firsova. The function creates gestures made of arpeggios. An arpeggio is made of a number of sub-arpeggios, each containing a number of notes, usually three or four.

Through arguments, the number and value of these parameters can be modulated or randomized, as can a number of others such as tempo and starting note. Amplitude is controlled algorithmically, or through another sensor such as an FSR or bend sensor.

As a message is transmitted by the Arduino board at a minimum of about 50 times a second, if an arpeggio were to be generated every time SuperCollider received a '1' value from the metapiano, there would be many instances of the same algorithm occurring simultaneously, overloading the synthesis engine and swamping the musical texture. In order to control this, a counter is implemented and incremented with each '1' message. Only when the counter has reached a certain value does the function trigger an

arpeggio. Even then, another counter is kept gauging the number of arpeggios playing at any given time and a further limit is placed on this.

It is in the creation and manipulation of configurations such as these that much of the detailed composition occurs. The arrangement described above causes a sufficiently prompt response for the performer to feel physically responsible for the sonic event, while ensuring that neither the musical texture nor the computer's CPU is swamped.

My original intent was that many interlocking algorithms triggered by different physical events should be configured so that they create a satisfying, varied and multi-layered 'composition' with a significant 'improvised' component when even an unskilled/unrehearsed performer, whether dancer or member of the public, played with the device. Due to the demands of performance and audience and lacking the luxury of many days of experimentation and rehearsal, I decided to supply a safety net in the form of a scheduled series of events – a seven-minute (approximately) algorithmic composition, although this can be lengthened, shortened or restructured easily. With this in place, whatever interactions the dancers instigated, there would be some thread to follow, some overarching structure.

So that the dancers should trigger appropriate events at appropriate times, the composition was structured using what I called 'scenes.' These were implemented as top-level functions directing the triggers from the real world towards particular sets of mid-level functions. During the first scene, a touch would be likely to generate a chord or small set of chords, a single arpeggio or small melisma. A subsequent scene would direct the gesture towards the generation of an arpeggio such as the one described above. Other scenes triggered rhythmic chords or microtonal swirls of notes. The use of scenes promises much in terms of a more 'improvised' and less scheduled musical structure. By allowing either the change of scene automatically, or through another as yet un-invented device, it should be possible in future to allow for more improvised experiences while maintaining feelings of structural dynamism and unity.

As a composer who was trained in the western art tradition, I find it a constant struggle to relinquish the layers of control so often necessary to the successful implementation of one of those earlier creations, and yet I am very drawn to the enabling freedom of expression allowed by technology. While I was unable to let go of the structures of western concert music sufficiently to risk the improvisation that was my initial aim, the structures created at least in principle provide a workable method to achieve this.

What is left are questions regarding the nature and importance of the interface itself: whether the nature of the devices and creations described above make a significant difference to the way people interact with them; or, indeed, the type of musical events or even structures they create.

A significant hint as to the answers to such questions may lie in the reaction of the choreographer and dancers to some aspects of the interaction with these devices during the small amount of rehearsal time available. Since there were of the complications involved in the activities described above – not least the batteries running flat or Bluetooth disconnecting (for instance) – I made it clear that I could and was prepared to trigger events from my own laptop, so that 'something' would happen. The choreographer made it equally clear that she and the dancers did not want me to trigger anything. This would, in their opinion, be 'cheating' and would cloud their ability to understand what was really happening in their interactions with the devices. In other words, even if there was a problem with the interface, it would be better for this to be openly the case. Whether this purity of approach would have been so welcomed had

there been serious problems with the performance will, fortunately, have to wait for another production as, in the event, there were no serious technical issues to contend with.

6. Conclusions and future developments

At least as far as the Metapiano is concerned, the Kings Place performance of Triggered represented a significant milestone in the development of this work, but not a zenith.

Suspending the devices proved an excellent idea, and was highly effective dramatically – this has opened up many options for future development. Any future use needs to consider the use of pulley systems to enable the devices to be easily raised and lowered. For venues where hanging objects from the ceiling or lighting rig is not feasible, boom stand systems would be a good idea.

Although the Bluetooth devices used for wireless communication worked well, I would prefer to use open, non-proprietary solutions where possible and so devices, such as the XBee, and systems making use of them, such as ‘Sense/Stage’, should be investigated. [2]

Less prosaically, the hanging panels revealed significant potential for the use of semantic links between image, paint and sound in the design of the interaction.

Of greatest significance is the development of these technologies for therapeutic uses in the ‘Touching Sound’ project, an international collaboration between musicians, therapists, programmers, psychologists, artists and others. In spite of many years of research into human computer interaction, there have consistently been issues with the explicit adoption of technology in therapeutic environments, not least because of the way in which clients and practitioners view such technologies: as unnecessary and intrusive. At the same time, there are many ways in which technology can be used productively, for instance in the spontaneous generation of aesthetically interesting artefacts as well as in the exploitation of kinesthetic and multisensory elements, such as those described in this paper.

The Touching Sound project seeks to describe, implement and analyse work that investigates unique methods of articulating and implementing expressive gesture, synchronisation and entrainment, primarily through shared physical interaction with objects. This includes the implementation of custom-designed and built hardware and software using methods that are as close to invisible to clients and practitioners as possible while still maintaining the benefits of cutting-edge digital technologies. In particular, activities in music performance, dance and various physical and arts therapies are considered.

All of these activities emphasise one thing: the links between composing, improvising, performing and the nature of the physical interfaces used are of crucial significance in many forms of music and that we are approaching a point where a fuller and more open experimentation with such links is becoming conceivable.

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BUTTERFLY WINGS OF PYTHAGORAS

JOANNA HOFFMANN

In my paper I recall Pythagorean idea of Universal Harmony, the first model that integrated the human inside with the rest of the world, questioning its validity in our times as well as its role in the process of redefining our humanity and relations with the nature treated no longer as the object of exploitation but as the subject of civilisational transgression.

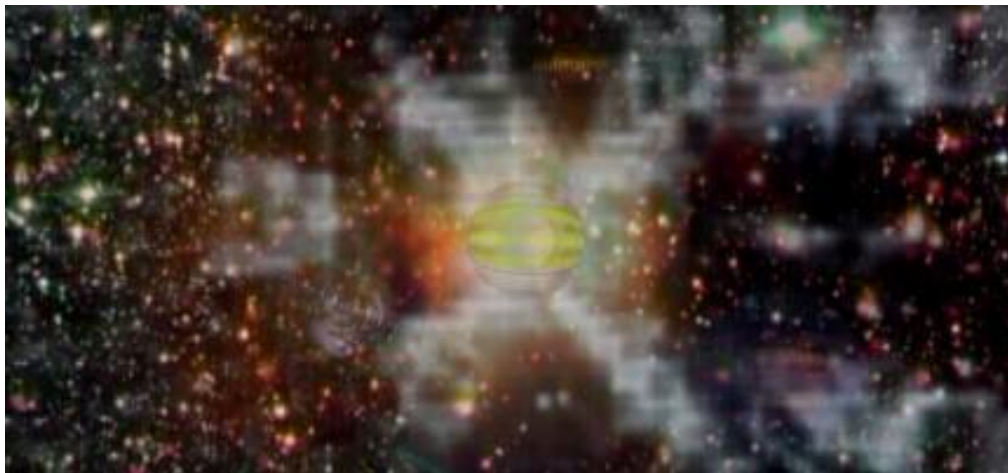


Fig.1 "Tones & Whispers", 2005, Joanna Hoffmann, still from the video animation.



Fig.2 "Hidden topology of being" 2011, Joanna Hoffmann, still from the video animation

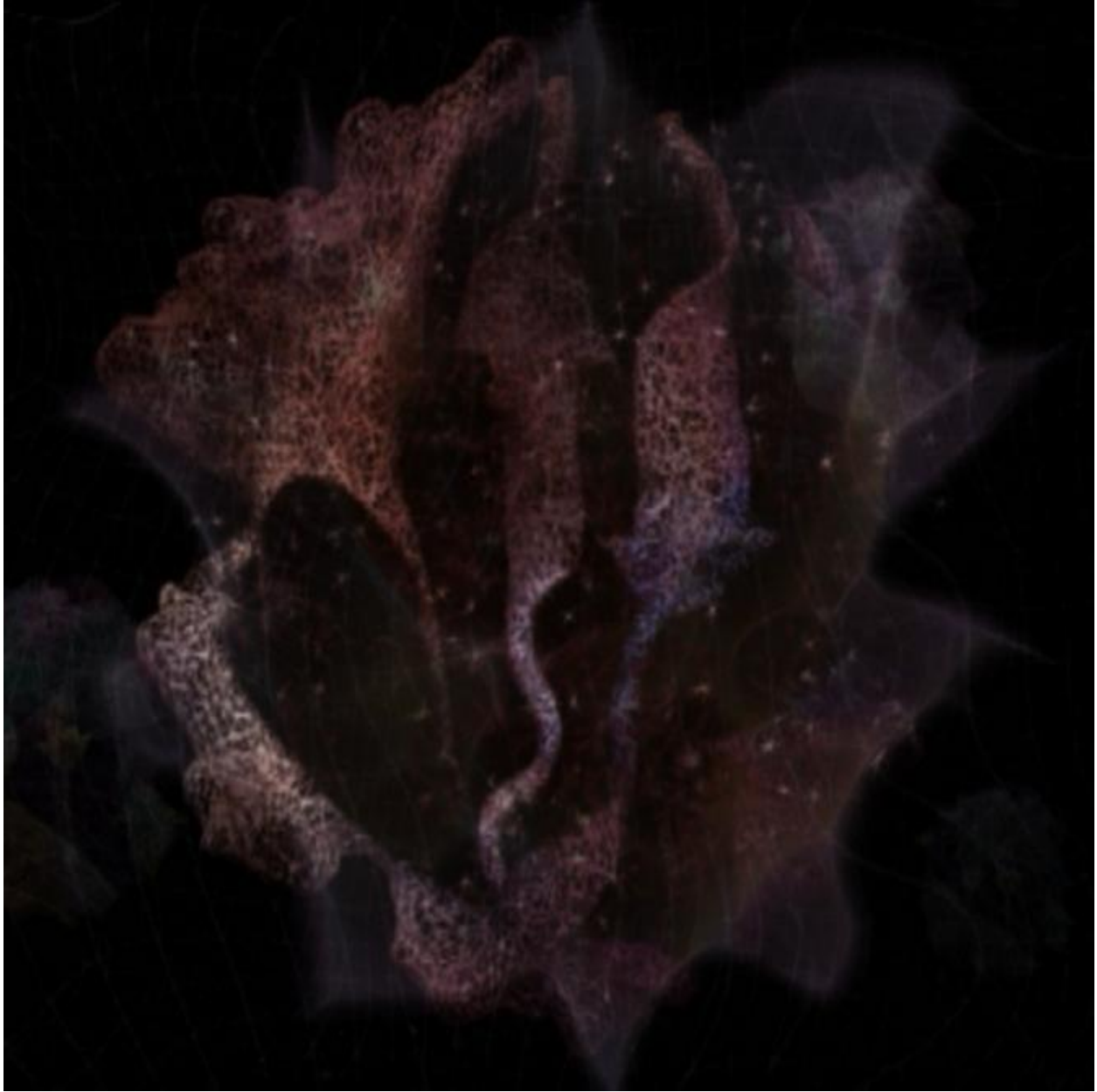


Fig.3 “Molecule”, 2011 Joanna Hoffmann, still from the video animation.

IN PYTHAGOREAN UNIVERSE

When we look at the “Millennium Simulation”, the most ambitious visualization of our Universe made by Virgo Consortium, and we juxtapose this impressive model with the image of human neural connections, we immediately notice uncanny similarities between these two complex systems. Is it the result of tools used for these visualisations or maybe there are actually more similarities than differences between the macro and microstructure of our Universe?

It was Pythagoras who first connected the human inside with the cosmic space. His idea of the Universal

Harmony has been considered as the most important, influential and beautiful concept born by the human mind.

Pythagoras believed that the whole Universe was music. He divided it into *Musica Mundana* (later known as Music of Spheres) and *Musica Humana* (music of the human body). Pythagorean Harmony was based on numbers and proportions. For him a triangle connecting distant stars, drawn on sand or heard in a triad chord meant the same – they expressed Logos, the hidden order of the world.

His system united philosophy, science and art, influencing their development. With time, their paths separated and today, as Gyorgy Kepes noted, our understanding of the world is divided into the rational knowledge frozen in words and numbers, and emotional knowledge embedded in sensual images and feelings. To regain an integrated vision, a consciousness that could apprehend all the richness and diversity of our experiences of the world, we have to use all our abilities to “merge the scientist’s brain with the poet’s heart and the painter’s eye.” [1]

By entering (with my poetic heart and artistic eye) the sphere of mutual relations between science and art I recall the beginnings of this union and ask about the validity of the Pythagorean idea of Harmony in our times. I begun my investigations with a series of works devoted to relations between micro and macro scales, between *Musica Mundana* and *Musica Humana*, The series employs a musical adaptation of the Music of the Spheres by Johannes Kepler, the father of contemporary astronomy, as well as data obtained by means of radio telescopes and other devices used nowadays to explore the Outer Space.

I paired this material with microsounds of my cardiovascular system and later brainwaves, discovering in them fascinating musical structures, with resonances and aliquots reaching all accessible to us octaves. It is worth to underline that for Pythagoras identifying the world with music was not a metaphor but the answer to his search for arche, the essence of the universe.

The series ends with the multimedia installation “Tones & Whispers”, presented at the Dana Centre/Science Museum in London in 2005, and realized with the support of the Institute of Neuroscience at the University of London. In this piece cosmic and human soundscapes merge and images of my brain mix with those of distant stars and galaxies. In fact my brain replaces here the Sun: the centre of Kepler’s celestial composition and of the universe of his times.

Today we know that our Solar System is not the heart of the Universe. Quite the opposite, we rotate on our small planet around one of a billion of stars on the outskirts of our galaxy, one of millions of galaxies racing through the Space, or, strictly speaking, together with the Space. Where should we look for a point of reference, then? One possibility is to focus on the brain and mind as its function; the nexus of individual sensations and perception of the world as well as the source of all ideas and concepts including the idea of the Harmony of the World. We can go even further and stop thinking in categories of centres (and peripheries). Then we may recognize the brain-mind unit as a “knowing-becoming-participating-valuing system functioning within a 'spacetime' context described by the synergetic collaboration between information within a system and information from outside systems”. This approach suggested by Tamar Levin [2] links the individual nervous system not only to biological/genetic, historical and cultural experiences but to a greater undivided whole: to the information space and energy of the universe. Looking again at the Millennium Simulation, one can imagine that somewhere in pulsating nooks of its vast volume, there is a fractal mote (his/her brain) that manifests the deepest creativity of matter: the intelligence of life.

LIFE MATTERS

During the last century, our knowledge of the world and of ourselves has expanded tremendously. Today we know that we are made of the same components as the rest of the Universe. Thus, it is optimistic to think that at the atomic level, as part of the universal recycling, we are practically immortal. Nevertheless the question: “what makes us alive?” remains unanswered. Today we acknowledged that Aristotelian definition of life, based on the notion of a living organism, is no more valid because life “happens” on the molecular level. Biological sciences claim that only DNA is alive, making the rest of the organism merely a part of its much larger habitat. What is confusing however, is the fact that no inherent quality has been found in a replicating gene that would differentiate it from the inanimate matter. The phenomenon of life turns out to be very context-dependent.

The shared genetic heritage of the animated matter makes us realise the biological unity of all life on the Earth. The harmony of nature however conceals a ruthless struggle of genes for survival and does not favour its components. Considering the ease with which our cells start to reproduce foreign genetic sequences, it might be concluded that if mankind is ever wiped off the surface of the earth, it might be the result of the lost “gene war”. Moreover, just like the extinction of dinosaurs, it would not disrupt the phenomenon of life and its further evolution. I referred to questions about the substance and meaning of life in my multimedia project “Life matters” realised during my residency at the International Centre for Genetic Engineering and Biology in New Delhi in India where I was working with research material on malaria, SARS and AIDS. I continued my investigations in the project “Proteios” developed at CEMA Centre for Experimental Media Art / Srishti College of Art, Design and Technology and the National Centre for Biological Sciences, Bangalore, India in 2009.

HIDDEN TOPOLOGY OF BEING

We usually identify life with the processes of maintaining and transmitting information and knowledge both at the biological and the cultural levels. Obviously, it is not the only interpretation. Life is also, to quote S. Symotiuk, “the way in which space exists, and vice versa; space might be treated as the way in which life exists.” [3] This tautological sentence has its consequences. In our common perception our reality is made of four dimensions but according to the superstring theory it contains additional dimensions compacted to the subatomic level and hidden from our limited perception. All dimensions are liquid in their interconnectivity, and the space-time is no more defined by “specified points” or “corpuscle” but by minute strings which vibrations secure diversity of matter. Our anew musical universe coupled again science with aesthetical desires. “If guitar strings can create the splendid music in the three-dimensional space - writes the physicist Saul-Paul Sirag - think how exquisite must be the music in the nine-dimensional space!” [4]

We assume that we are connected with ourselves and environment in much more subtle ways than told by our senses, but we have to wait a long time before the evolution of our brain will overpass its current limitations and allow us to fully experience our multi dimensional existence.

Meanwhile we have to rely on our imagination and use available keys for its stimulation and for representation of our assumptions. In my artwork “Hidden topology of being” I use a model of a protein molecule as a space-time unit of my “liquid universe”. Its folded globular form brings to mind Calabi-Yau manifolds, geometric formations containing contracted dimensions, whilst exposed to X-rays it shows an

arrangement of atoms that might serve as a map of the starry Sky. Bridging micro and macro scales, scientific imagery with daily recordings and poetry, I translate scientific ideas into the area of art as a source of personal and collective consciousness inviting intuitive examination of the unfathomable nature of our reality.

The structure of a protein is used also in my interactive installation “Molecule”. Here the 3D model of its atomic arrangement merges with ever-changing sequences of video-animations referring to basic elements and states of matter. The installation creates a dynamic and contemplative landscape, a kind of atomic puzzle, underlining the fundamental homogeneity, instability and interdependence of components of our world. The interactive aspect of the installation enhances the experience of belonging to some dynamic system of interconnections.

FROM HARMONY TO SPECTRUM OF POSSIBILITIES

Pythagorean idea of the universal harmony has not gone stale but evolved together with changes in our knowledge of the world. In the 19th century, theories of evolution and thermodynamics introduced motion and variability to the otherwise stable cosmic composition, while non-Euclidean geometries opened the way for new space-time theories and interpretations. At the threshold of the 20th century, quantum physics confirmed Pythagoras’s intuition, igniting our modern imagination with vibrations of micro-strings of the matter in eleven dimensions. Greek Tetractys was replaced by physical constants describing the Universe in which the biological life evolved. Seen in a new light, the oneness of nature finally rebutted our long-built illusion of our privileged position in it. The proud Renaissance monument of the human being as a measure of the Universe cracked and old Pythagorean attitude emanated through its crevices.

Born out of the observation of the chaos of the world, Pythagorean Harmony searched for interconnections not for hierarchies. Today we learnt that synchronization, adaptation and interaction are at heart of deterministic chaos that rules natural phenomena. Its notorious “butterfly effect”, in which the slightest perturbation of the system leads to unpredictable but expected and unavoidable changes, proves the fragility and dynamics of relations between animated and non-animated, micro and macro environments. By all means, it concerns also the human being from his genetic code, social behaviour to mental processes.

We learn to accept that nothing in our world is for granted and there is no defined future only the spectrum of possibilities.

Paradoxically the progress in science and technologies together with the crises of humanistic ideologies give us an opportunity for re-questioning and redefining our humanity and for a renewed approach to nature treated no longer as an object of exploitation but as a subject of civilisational transgression.

BACK TO THE UNIVERSE

Our spiritual, intellectual and physical environment is changing rapidly. We cannot foresee how quantum, biogenetic and computer revolutions will transform our lives and ways of our thinking. Nevertheless using the very poor knowledge we have today we can make some random predictions and direct our endeavours.

Inspired by scientific breakthroughs in search for water in the Universe, I visited La Reunion, a tiny island

on the Indian Ocean, a home of SALM – Moon/Mars Analogue Site, serving the research towards our future colonisation of the Space.

According to scientists it will take us at least 300 years to make Mars habitable and considering all our earthly dangers as well as the development of our civilisation we should start the process of adaptation now. Yet, turning our eyes and minds towards unknown places, it is worth to recall words of one of the heroes (Snaut) in “Solaris” by St.Lem: “We leave for the Space, ready for everything that means for loneliness, martyrdom and death. Through modesty we don’t say it aloud, but we think sometimes how splendid we are. Meanwhile, meanwhile we don’t want to gain the Space, we want only to extend the Earth to its limits.(...) We don’t know what to do with other worlds. One is enough and we already choke with it.” [5] In other words, for the human consciousness there is no difference between apprehension and appropriation. The strong anthropocentric tradition (reflected in the anthropic principle) reveals a deeper problem of the human condition: inability to go beyond our common human subjectivity. Nevertheless by acknowledging and understanding our boundaries we can extend our conceptual reach and “not choke” with our own world. If we manage to mature our humanity and thus our sustainability, we may succeed, despite the threat of a nuclear war, deadly pandemic and environmental collapse, in creating a truly planetary civilization [6] able to manage and share resources of its own planet; the civilization based on advanced cooperation and cultural convergence. That would be our first step towards stars. Then in thousands of years, as a stellar or even galaxy civilisation we may come across the Golden Record, our today’s message to distant civilisations, carried aboard Voyagers through the cosmic space and again listen to its immersive invocation: vibrating tones of J. Kepler’s Music of Spheres, the testimony of power of human creativity, imagination and visions.

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6. I am referring here to the classification of civilizations introduced by Nikolai Kardashev and Freeman Dyson based on the ways they utilize energy: 1. Planetary civilization, 2. stellar civilization and 3. galaxy civilization. Freeman Dyson, *Disturbing the Universe* (New York: Harper & Row, 1972).

PAINTING AS PROGRAMMING: CASEY REAS AND THE AESTHETICS OF GENERATIVE CODE

Meredith Hoy

This paper considers the work of Casey Reas, an artist whose output hovers between painting and computing. It proposes that the seemingly insurmountable division between the conceptual and the aesthetic is not absolute, and argues that Reas's practice, one that is fundamentally painterly but also tied to the specific functions made possible by a digital computer, offers an alternative to this artificial distinction.

In 1999, Jerusalem-born, New York based artist Daniel Rozin constructed a wooden mirror. In it, a heavy, octagonal wooden frame encases a grid of 830 square wooden lozenges, each of which is mounted on a small servomechanism. When a viewer approaches the mirror, each servomotor receives information relayed through a computer program from a hidden video camera, and mechanically angles the square toward or away from the overhead gallery lights. The degree to which each square is illuminated by or shaded from the external light source determines that square's visible gradation from light to dark. As each servomotor receives its real-time information about the figure standing before it, a grossly pixelated impression of the viewer's body coheres into visibility, accompanied by the faint clicking sounds of hundreds of scrabble pieces spilling over and against each other in a continuous loop.

Wooden Mirror is the first in a series of interactive installations fabricated from a variety of opaque, usually non-reflective materials, including wooden pegs, circles of laminated paper, woven fabric, and trash collected from the streets of New York city. In this series, Rozin announces that his aim is to explore the relationship between the analog and the digital, to "inflict digital order on a material that is as organic as it gets." But, this opens the question: in what features does the digital reveal itself? Why should we think of this piece as digital? Does it use digital technology to create an analog aesthetic experience? Or, does it employ analog technology to leave us with an aesthetic impression of the digital?

What we would expect to see in approaching a mirror, even a "fun-house" mirror, is a detailed if insubstantial image of ourselves generated by the refraction of light, no matter how distorted the results. When confronting *Wooden Mirror*, however, we cannot say the pixelated impression hovering before us is a "reflection," in the same manner as the reflections that appear in the silvered, glass mirrors to which we are so accustomed. Glass mirrors create a sense of continuity between the reflected world and the physical world in which the viewer stands.

Rozin's *Wooden Mirror*, on the other hand, compels us to gaze *at* instead of attempting to look *through* the wooden pixels as they sweep towards and away from the light. The opaque, and non-reflective lozenges render a granular likeness of the viewer, but in such a way that calls attention to the modular composition of the interface—the grid of wooden pixels—instead of effacing them in favor of an illusion of transparency. The particulate discreteness of the "mirror image" renders an indistinct, discontinuous impression, dismantling the possibility of a perfect virtualization by foregrounding the digital elements that give rise to the overall pattern.

Most often, it will be presumed that digital systems and electronic computers are equivalent because technologically speaking, electronic computers process information digitally. The digital is a term that

has become largely transparent—digital imaging, digital technology, digital sensors, all denote a technological milieu rather than an aesthetic one. However, instead of thinking of the digital as a technological category, in which an object is “digital” if it is a product of electronic computational processing, I am defining the digital as an aesthetic category, where “aesthetic” is deployed etymologically, to refer to the apprehension of features of an artifact that are available to sense perception. The digital then becomes a configurative and aesthetic modality rather than a technological one. Consequently, just because a picture is created using an electronic computer, whose underlying processes are computed digitally, it might not necessarily exhibit perceptibly digital features. And, contrastingly, an artifact that is made without computational processing might have digital features.

To more concretely illustrate what I’m saying, think, here, of each wooden square in *Wooden Mirror* as a “digit”—a discrete unit that, when combined into a schematic array, constitutes a digital screen. While this schema is comprised of physical, tactile materials, instead of electronic impulses, it is similar to a bit- or pixmapped computer screen, in which the pixels are spatially mapped, arranged in a regular pattern. The surface of Rozin’s so-called mirror is configured digitally, then, insofar as it is constructed of discrete, interchangeable, and articulate modules.

Even if it is a technological possibility that the pixel-like “modules” in Rozin’s mirrors could be further and further refined, to the point at which they could no longer be perceived by the human eye as individual units, and even if it is feasible that the materials deployed in these mirrors could mimic the color and texture of the person or object facing it, the more interesting question to me is why artists like Rozin choose *not* to pursue that technological teleology, and instead choose to foreground digital discreteness. Digital technology may be capable, notionally, of virtualizations that appear perfectly coextensive with the physical world. The number of calculations and speed at which they can be carried out by computers is potentially infinite, the upper limit determined only by the limitations of existing, and as we know, always dynamically changing memory storage and processing speeds. Nevertheless, it is important to ask what is achieved by making the digital sensorially apprehensible, by keeping it open as an aesthetic and analytic category worthy of conceptual and perceptual consideration.

I contend that giving aesthetic priority to the digital, instead of masking digital configuration, provokes viewers to consider how a variety of pictorial techniques and technologies involve digital or proto-digital processes at various stages from conception to realization, even if the final product obscures most indices of the technology used in the process of structuring the depiction. I argue that the phenomenon of digitality has been a mechanism undergirding representational technologies for far longer than electronic computers have existed. As such, the digital is not simply an art historical problem applicable to the study of contemporary art, but can be extended to a much broader consideration of how modules, matrices, and other digital techniques have shaped the norms and trajectories within various depictive modalities, from pictorialization to musical notation to cartography.

Rozin’s work is palpably discrete, programmatic, and digital, foregrounding the digital at the level of interface. But I will now turn to the “programmed paintings” of Casey Reas. As opposed to Rozin, Reas treats the digital as a primarily technological category, rather than an aesthetic one. As such, his work only occasionally and tentatively reveals the digital architectonics underlying his graphic schemas; most often his work is suffused with the analog properties of continuity, smoothness, and gestuality. I see Reas as a liminal figure, who operates in an indeterminate range of picture-making, one that is fundamentally tied to the specific functions made possible by a digital computer, but whose morphological structures are often dense, continuous, and remarkably and markedly painterly. Despite his thorough

investment in software-driven, computational art, Reas's work often obscures the discreteness of its underlying structure. The final output, in other words, is not heavily articulated in the manner of Rozin—Reas does not overtly embrace the pixel as a fundamental expressive unit. Rather, his works experiment with the aesthetic possibilities of algorithmic variation within a given visual system, a process that explores the limits of computation, but without necessarily offering up a digital aesthetic.

Let me briefly explain what I mean by analog aesthetic properties. Within the history of aesthetics it has been presumed that pictures would be a product of analog processes, and would therefore exhibit aesthetic features, which include continuity, smoothness, and perceptual ambiguity. The analog picture is irreducible, both on the level of form and content, to a distinct quantitatively assessed set of values.

The digital, on the other hand, emerges from a very different structural logic; digital composition is inherently discrete, schematic, metric, and modular. The classic example given by philosopher Nelson Goodman in 1976 to differentiate analog from digital inscriptions are the morphologically similar but semantically distinct illustrations of an EKG and a painting by the 19th century Japanese "floating world" artist Hokusai. [1] In the Hokusai painting, exemplary of analog values, every linear modulation, every increase in pressure or thickness of ink potentially affords a new layer of meaning. The EKG, by contrast, exemplifies a digital system, in which only the abscissas and ordinates bear meaning but the lines connecting them are insignificant. So, despite the morphological similarity between the two depictions, they function very differently.

Information is, of course, processed digitally in today's electronic computers, but the digital as an analytic and perceptual category can be disaggregated from the technical specificities of today's hardware and software. Rather, the digital refers to a particular configurative schema—to a state in which materials or signals operate and are operated upon as discrete states, as distinct from the continuous variation of the analog. Digital symbol systems may appear in the form of pixels, but may also manifest in a variety of other mark-making practices, such as points on a graph, in which a unit of measure has been assigned and outside of which no indeterminate state can be registered.

If Reas's use of digital technology is haunted by the spectre of analog painting practices, by a desire for the spontaneity and gestural contact that is traditionally associated with painting, this tension that arises in his work makes him an ideal springboard from which to see how the analytic category of the "digital" can, and should be disaggregated from electronic-computational machines. His work demonstrates how artists can utilize computational technology in a multitude of ways—to highlight the properties of digital graphic composition by foregrounding pixels or other structural building blocks, or to occlude the picture's digital infrastructure, leaving only indirect clues, or none at all, to its digital ontology.

It is within the architecture configured by the strict causal chain of computational logic that the oscillatory movement between digital and analog becomes evident in Reas's work. For example, Reas's series *Tissue*, beginning in 2002, layers fragile, transparent webs of spindly lines, creating dense, continuous and replete painterly surfaces, which would seem to position his work at odds with the constitutive features of digital aesthetics as demonstrated in *Wooden Mirror*. The lines themselves are generated by the movements across the screen of small bots or vehicles that leave trails of line and color behind them. The point I want to emphasize here is that while the technical, procedural and programmatic constraints of computers make them unable to process or deal in ambiguity, *Tissue* mobilizes the programmatic logic of computation towards an ambiguous end.

The characteristics visible in *Tissue* do not appear to be digital in the sense I am using it. However, the elements that produce the analog, painterly, ambiguous surfaces in these works turn out *not* index the gestural immediacy implied in the act of drawing, as we may have thought. Even though the surface appears to be aesthetically analog, it is in fact a set of digital elements drive the graphic output of the piece. As I have indicated, the lines extending across the screen or the print are created by digital “vehicles.” These vehicles mimic mechanical sensors in neuroanatomist Valentino Braitenberg’s studies of nervous systems in the 1980’s. In a different version of *Tissue*, an interactive, CD-ROM version of the piece involving touch and motion sensitive technology allows users to move the “dots” with their fingers, changing their trajectory and thus the visible structure of the composition. As such, the two versions—print and interactive installation—reveal the digital to differing degrees, the print concealing it, the interactive installation making it accessible to perception and interaction.

In an electrocardiogram, only the ordinates and abscissas are informationally relevant—the lines connecting them are insignificant. *Tissue*, on the other hand, privileges the connecting lines: what would be, in a notational system like the EKG, secondary “information.” What the viewer observes, instead of the digital units themselves, as in the case of *Wooden Mirror*, are the tracelines extending behind the elements, similar to the line of frozen vapor trailing an airplane in the sky. In a time-based version of the piece, after a period of scrutinizing the lines as they loop and intersect in seemingly random patterns across the screen, the intently watchful viewer might glean relationships between elements, and even potentially their position on the screen. We might think, then, of this moment of revelation as an instance of the digital furtively showing itself, coming into a partial visibility, but remaining camouflaged by the analog. Rather than directly seeing the simulated mechanisms, as in the see-sawing movement of Rozin’s wooden pixels, we gather their information second-hand. We can guess at their level of activity and the length of their simulated lifespan as drawing agents from the complex curvatures of the lines and the density of their entanglement. These knotted skeins become the sensorially apprehensible effect of the setting-into-motion of a digital system. What we have before us is a painterly, seemingly analog visual world that is actually a visualization of the byproducts of a digital system in the act of calculation and computation, but it is not itself aesthetically digital. This is an area in which a potential divide between “computational” aesthetics and “digital” aesthetics becomes visible. The system operates computationally, and perhaps we could classify the continuously unfolding loops of multi-colored lines as exhibiting a computational aesthetic insofar as we are watching the graphic output of computational processing proliferate before our eyes. But the “digital” stubbornly conceals itself within the tangle of lines.

Reas’s works after 2004, which he calls “Processes,” begin to allow the digital literally to parallel the analog aesthetic exhibited in *Tissue*. They exhibit a tri-partite structure, in which natural language “instructions,” in homage to LeWitt, are accompanied by a divided screen. In *Process 18*, the right screen displays a simplified digital schema of the underlying processes of the generative software. Here, a skeletal array of short white lines against a black screen reveals the “mechanism” determining the behavior of individual parts as they touch, collide, and rebound. In *Process 18* the right screen gives up the “trick” or the “game” or the “conceptual undergirding” of the work precisely by showcasing the schematic, digital structure that underlies the painterly swaths on the left screen.

On the left screen the mechanistic structural elements—the skeletal backbones—are erased, as the orthogonals and transversals disappear from a perspective painting, leaving the surface effects—here, curved, layered lines, of varying degrees of transparency and various degrees of saturation on a grayscale—available to sensory apprehension. In contrast to the austere structuralism of the right hand screen, then, its neighbor on the left reveals the more “painterly” aspect of Reas’s multi-layered process

compendium, offering up an abstract, gestural surface that, minus the textures, is more reminiscent of Jackson Pollock's Action Painting than Rozin's heavily digitized *Wooden Mirror*. However, these works are more "digital" than the others I have discussed with you today because the digital and analog surfaces are placed in parallel. In *Process 18* the side-by-side placement of the screens does *not* erect a hierarchy in which the analog is granted final pride of place.

In *Tissue*, digital mechanisms, such as a line of a specific number of pixels, become drawing "agents," but in the act of drawing, they obscure their digitality, rendering the digital, in Reas's practice, a technological rather than an aesthetic category. In this sense, Reas *reverses* the schema of Rozin's *Wooden Mirror*. There, the motion of the servomotors is perceptually analog—their movements and adjustments register as continuously correlated to the position of the viewer, just as a needle in a pressure gauge rises and falls smoothly, as a direct effect of the modulations in the physical quantity of pressure in the gauge. It is only the outermost layer of the interface—the array of discrete, modular wooden lozenges—that defines Rozin's mirror as *aesthetically* digital. In *Tissue*, on the other hand, the computationally simulated bots mimicking Braitenberg's neural motors are digital—they are registered by the system in terms of their position at any given moment. But whereas the bot's *position* is digital—it can only occupy one encoded position at a time, the visible output of the system is continuous, fluid, and aesthetically analog. In the end, Reas's work does not evidence two entirely separate strains. Instead, these two impulses swirl playfully around one another in a noisy feedback loop. They are each practices built on digital platforms, but shot through with the spectre of the analog.

To return to my opening example, Daniel Rozin in *Wooden Mirror* formulates a visual (graphical) proposition in which the "digital" becomes a sensed and experiential, instead of a technological category. Here I am placing the digital in an expanded field, so that it is a mechanism, a process, and a constructive method that operates well beyond the boundaries of computational technology. Once digitality is disaggregated from contemporary electronic computers, it becomes a category that can be used to address works of art, techniques and technologies that may speak in a different language than and thus require a different interpretive framework than pictures and artifacts configured through analog processes.

What I call the digital is a mode of visual understanding that has appeared at other times under other names. It speaks to the replicability of the pointillist dot, and to the simulated matrix of perspective. Here, the digital ceases to be a highly technical term relevant only in contemporary discourse, but becomes an art historical project about making connections. This is not to enforce *congruence* between all digital, proto-digital, and quasi-digital systems—I do not claim that perspective, pointillism, op-art, and contemporary computational artworks are reducible to historical, cultural, and formal equivalence. Instead, I bring out features of these works that interface with my notion of the digital in complex and potentially idiosyncratic ways. My question of whether the "look and feel" of digital media is correlated to the appearance of individuated "digits" within pictorial structure is ultimately not merely a formal, but also a social, philosophical, and art historical problem, which seeks to discover how an evaluation of digital composition might add a new narrative layer to the long art-historical discussion about how and why pictures "mean," and what they say about a given culture in a given historical moment.

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VIRTUAL RESISTANCE: A GENEALOGY OF DIGITAL ABSTRACTION

MEREDITH HOY

According to one narrative, an evolutionary trajectory for computer graphics begins at rudimentary figures and progresses towards visualizations of a world whose properties mirror our own. But there is a tradition of computational abstraction that renders visual equivalents of abstract mathematical calculations. This paper considers whether computational abstraction fits a modernist narrative or whether it envisions a new call to order.

According to one narrative, the history of computer graphic imaging has privileged verisimilitude, in which a virtual image imitates optical reality as faithfully as possible. This account posits an evolutionary trajectory for computer graphics beginning at pixel-based figures and progressing towards rich visualizations of a world whose properties mirror our own. This history may hide the fact that this virtual world is often visualized as if it were captured by a camera; the camera-based image is simulated by encoding a mathematical model of a picture as it would appear through a lens, with a specific field of view and focal length.^[i] Computationally generated pictures often analogize the visual qualities of a world seen through a camera lens, and would seem to tend towards the particular qualities of virtuality, and the visual distortions, produced by a camera.

But there is a tradition of computational abstraction that revels in the facility of the computer to render visual equivalents of abstract mathematical calculations. Such screen-based abstractions generate imagery based on formulae for physical forces such as gravity. Painterly compositions emerge as a result of inputting random values into an algorithm encoding change over time. This paper assesses whether there are a set of principles with which computationally based abstractions are concerned, and what kind of “world” is imagined through this algorithmically generated visual model. Taking into account the history of abstraction in modern art, it considers whether computational abstraction fits into a modernist narrative or whether it envisions a new call to order distinct from that set forth by 20th century modernist movements.

The aesthetic of mimetic virtuality demonstrated by graphics imitating a camera can be distinguished from an aesthetic of computational abstraction by the latter’s typical foregrounding of discrete values mirrored in the structure of the picture. A digital image is defined by its discrete composition out of distinct, interchangeable units. This is most easily recognized in the formal properties of the pixel, but can also be conceptualized in a more theoretical manner, as in Nelson Goodman’s formulation, according to which “to be digital a system must not be merely discontinuous but *differentiated* throughout, syntactically and semantically.”^[ii] This formulation adds another dimension to the theory of picturing in general, one in which analog and digital aesthetics can be formulated and evaluated as distinct categories. There is also an aesthetic trajectory that bridges the gap between the two modes of analog and digital by examining the structural features underlying a given representational system through strategies of abstraction.

One exploration into the mechanics of recorded moving images occurs in the phenomenon of Structural film that emerges in the 1960’s. Deploying such strategies as loop printing, rephotography off the screen, the flicker effect, and fixed camera position, structural film is “a cinema of structure in which the

shape of the whole film is predetermined and simplified....and what content it has is minimal and subsidiary to the outline.”^[iii] Structural film unfolds algorithmically, according to a predetermined system, which provides the rules according to which the film proceeds. Structural film is invested in uncovering the material infrastructure behind the continuous motion we come to associate with cinematic technology. It also, crucially, often favors abstraction, for example in the films of Paul Sharits, as a convenient mode of exploring film technology.

To understand what kind of images or objects will be most likely produced within a particular technological milieu, it is imperative to consider the facilities of that technology—the ways its affordances and constraints will, alongside creative decision-making on the part of the artist and other factors (such as cultural norms), dictate the types of forms that will be produced by that technology. While most traditional narrative film attempts to make the medium transparent through such techniques as suture, in which the editing and other elements of the cinematic apparatus are suppressed, structural film examines the material qualities of the filmic medium. Like conceptual art, in which the visual qualities of the final product are secondary to the idea underlying and driving its production, structural film reveals the mechanics of film, or the “idea” of film itself. Structural film is, therefore, “cinema of the mind rather than the eye.”^[iv] Often, for example, structural film will use rephotography to emphasize the graininess and flatness of the image, disrupting the reality effect or impression of virtuality that might otherwise occur.^[v]

Alongside structural film, early computer animation utilized the particular visual characteristics of computationally generated imagery to reveal what I have called a digital aesthetic based on discreteness and the use of an interchangeable module as the fundamental unit or building block with which computational pictures are constructed. I suggested above that while the history of analog picturing privileges qualities such as smoothness, continuity, and indiscernability of internal parts, the “digital”, recognized qualitatively as having its own particular visual characteristics, reveals its constitutive discreteness, its ability to calculate and generate patterns based on the computation of individual values. This often results in the production of an abstract visual field and the rejection of mimesis in favor of a direct interrogation of systemic principles.

Examples of early deployment of computational strategies for the production of “art” emerge in various media, including film. Stan Vanderbeek, Jordan Belson, and John and James Whitney are among the most important producers of abstract film that utilizes computation—a phenomenon that Gene Youngblood calls “cybernetic cinema.”^[vi] Cybernetic cinema, for Youngblood, is an approach to the production of moving images that privileges not merely a photographic capture of the external world, but situates itself in terms of the relationship between humans and technology, or more precisely, as Zabet Patterson has articulated, “under the auspices of the human-machine feedback loop.”^[vii]

The link between abstraction and technology is observable throughout the history of modernism. The rise of modernism is concomitant to the rise of industrial and reproductive technologies, and as such, technology itself becomes the subject of art. Modernism is also recognized as bringing about the advent of abstraction in the visual arts, and while technology and abstraction might seem at first glance to be unrelated, or to follow divergent principles, they are in fact inextricably entwined. Abstraction begins to turn toward the look of the technological in numerous instances, as in the proto-computational, pixelated forms of Victor Vasarely’s Op-Art and in the synthesized mandalas of John and James Whitney.

Meditations on the expansive effects of technology on the horizons of visual representation in modernist art practice are nearly endemic. Futurism gives up “meat” (the representation of human figures,

especially the nude, in the history of Western art) in favor of creating a visual universe that celebrates the beauty of speed, simultaneity, and the clang of machinery, all phenomena directly attributable to the compressions of time and space wrought by new technologies.^[viii] Futurism does not only depict machinery, but it also explores the way in which technology provides a new visual and perceptual experience of the world—it examines not only what technology can do, but also the ramifications of that technology on our consciousness, for example the shrinking of time and space that occurs with the invention of mechanisms for fast transit, such as the automobile.

But modernism has also been characterized by a concern with the spiritual, with purity, often achieved by the reduction of form to its most basic elements. Total abstraction, then, with its aims towards a spiritual universalism, would seem to be opposed to a technological worldview focused on functional forms. But as RL Rutsky has pointed out, a formalism oriented towards the *look* of technology in the end abstracts the technological from functionalism, so that the technological becomes a representational trope that speaks toward an overall word view rather than a direct portrait of specific technological devices. Heidegger has argued that “the essence of technology is by no means anything technological”—technology is not revealed in particular objects, but in a turn toward a technological way of thinking, in the way that new technologies reveal aspects of the world to us.^[ix]

Ultimately, technology and spiritualism become deeply imbricated. The theosophic foundations of De Stijl, led by Mondrian and Van Doesburg, merge spiritualism and functionalism. Abstraction is posed as the antithesis of nature and the natural—it is “functional” and ordered as opposed to the disorder of the natural, and is of the spirit, which is also separate from nature. Universalism and abstraction are deeply imbricated with one another, united in their opposition to nature, as is evident visually in the precise geometrical angles and forms of Mondrian’s and Van Doesburg’s painting. These geometries are linked to modern urban life; the “genuinely Modern artist sees the metropolis as abstract living converted into form.”^[x] Moreover, modern living is characterized by the machine, and machines are, counterintuitively, connected with spirituality; “the machine is, par excellence, a phenomenon of spiritual discipline.”^[xi] Abstraction, now associated with the functionality of the machine, in turn becomes a function of the machine, as is visible in the films of Vanderbeek, the Whitneys, and later generative computational “drawing.” (And it is notable that the Whitneys state an alliance with Mondrian and his view that abstraction attains a “truer” reality.^[xii]) The images we see unfolding on the screen can be read, alternately, as simulacra of computational functions or as indexical traces of the same. This undoes the opposition between autonomous generative grammar and indexicality, given that generative grammar can be seen as leaving its own imprint in filmic form.

“Function” can have various meanings. Computers are functional in their ability to create a model of the world by numerically calculating and graphically representing calculable data. This utilitarian view of function can be set against the theory of abstraction, as proposed by De Stijl or the Suprematists, in which abstraction provides an indirect model for universal social freedom. Both approaches to abstraction have a distinctly utopian bent, the former imagining a perfect simulation of the world attainable through the powers of computational machines, the latter championing the capacity of abstraction to produce social harmony. The two poles of realism and abstraction, therefore, eventually converge in their utopian teleology.

Film and video are most often associated with principles of realism—they are technologies whose particular affordances lead toward mimesis. As a reproductive technology, film might be thought to have the capacity to reproduce the world in much of its fullness; film both reproduces the world and is itself reproducible. But cinematic trends toward abstraction have coexisted with traditional narrative film, as

we see in early experiments with abstraction such as Duchamp's *Anemic Cinema*. Abstract, generative computational video takes filmic abstraction even further, going beyond abstract cinema's exploitation of shape and line to offer a visualization of often *invisible* forces such as push and pull at various rates. Mark J. Stock's simulations, for example, combine individual elements exhibiting simple behaviors into "complex galaxies" of abstract, moving forms whose rules for development and change are governed by a mathematical system with distinct parameters. According to Stock, these fluid visual landscapes reveal "the natural origin of their rules. This is the way of computational science: to break complex, real problems up into many smaller and easily solvable problems such that the ensemble predicts the behavior of the real system."^[xiii]

One can go one step further to claim not only that technology and abstraction have been linked from modernism forward, but that there is a particular view of technology and technological operations that foregrounds a computation and calculation. This computational order privileges systems that deploy numerical values or other non-numerical forms of calculation (any kind of "system") to produce its results, in this case the visual field of representation. The work of Frieder Nake and George Nees presented a mode of artmaking in which the artist's unique capacity to manifest the beautiful is supplanted by the computer, leading to a rationalization of beauty, a notion of beauty as emanating from programmatic schemas. Amongst early computer artists, including Nake and Nees, there was no small anxiety about this notion of programmed beauty—could the artificial generate an authentic work of art, or would the experience of beauty be authentic? Eventually, the most likely conclusion to be drawn is that what is being accomplished is not merely the imitation of pre-existing modes of artmaking, but that something new is being introduced: an art that foregrounds the abstract structures produced through programming. Machine-realized art moves us away from the virtuosity of the artist's hand, the grand designs of her mind. Computationally executed art comes as close as possible to completing this circuit. In so doing, it envisions a world of values and forces, understood better in terms of computational efficacy than mimetic reflection.

A brief look at the history of computing reveals the development of a philosophical trend in which mathematics and systems theory play an increasingly prominent role in theories of knowledge, human behavior, and even art. Researchers such as Turing, Von Neumann, Shannon and Weaver, and Wiener postulate that phenomena can be accounted for in terms of logical operations. "Rationalization" in representational terms consists of analyzing and reducing form to its most basic elements, whether this is the simplified form of the square or the breakdown of the world into data.^[xiv] Likewise, abstraction is a process of stripping down worldly phenomena into its most elemental or essential forms. In this way, abstraction can be viewed in terms of rationalization, as a mode of quantification of form into a series of operations. Thus, abstraction can be both spiritual, in its search for essences, and procedural, in its breaking of matter into its constituent operative parts.

George David Birkhoff, the American mathematician, proposed that the beautiful is a function of order, so that something with the greatest amount of order and the least amount of complexity is the most beautiful.^[xv] This parallels the theories of abstraction in the history of modern art that have attempted to systematize visual signs through the reduction of elements such as shape and color to their most basic forms. As I have suggested, abstraction, for visual artists including Malevich and Kandinsky, approaches spiritual purity.

Information aesthetics are often associated with generative art, which has been defined as art that deploys a system, such as a computer program, that is "set into motion with some degree of autonomy contributing to or resulting in a completed work of art."^[xvi] A work that is designed and carried out

using a pre-determined system that unfolds with or without the intervention of the artist's hand does not necessarily but will often demonstrate the aesthetic or formal properties of that system in a self-reflexive manner. Thus, the visual world built by these systems is one that replaces mimesis with an exploration of repetition, transformation, and parametrization.

Looking at Mark J. Stock's 2009 *Rising*, it becomes apparent that because informatic and generative art is concerned primarily with the principles and system with which it is constructed, it will be more likely to remain unconcerned with verisimilitude. Viewed from one angle, generative art emerges from a lineage of proceduralist aesthetics, wherein "inanimate accuracy" is substituted for "human touch."^[xvii] Generative graphics reveal a field of operations whose principles of change—growth and decay, for example—are given by certain encoded parameters that exist and unfold apart from the artist's decision-making process. Because it is computational, the system necessitates fragmentation, the existence of parts that can be set into motion by the program. As a visual form, generative art is certainly concerned with the aesthetic qualities of its product, but the aesthetics are defined by the interactions between parts and the emergent qualities that develop as a result of this interaction.

Lev Manovich has defined the aesthetic quality of computational art in terms of an aesthetics of complexity,^[xviii] which exists in contradistinction to the simplified forms of earlier 20th century modernisms, such as the extremely reduced formal vocabulary and palette of the Russian avant-garde, and particularly Suprematism, in which Malevich "in 1913, trying desperately to liberate art from the ballast of the representational world...took refuge in the square form."^[xix]

I would define computational aesthetics not so much in terms of complexity, but consider instead the aesthetic ramifications of the computer's ability to carry out rapid, repetitive calculation and to build structures out of discrete, interchangeable units. Looking at Gursky's *99 Cent* or Jennifer Steinkamp's 2008 *Daisy Bell*, we can observe instead an aesthetics of repetition, a sense of an indefinitely extendable universe of discrete elements arbitrarily cut off by the boundary of the screen, the mechanism by which this computational universe is made visible.

This repetitive calculation can be used either to mask or to highlight a picture's computational underpinnings, to build a dense, virtualized simulation or to emphasize the discrete, numerical infrastructure of the image. Artists such as Jim Campbell, who in his *Ambiguous Icons* series reduces moving figures to broad, highly unresolved silhouettes by filtering them through a grid of LEDs, choose to foreground the fact that what ultimately appears as a picture on a screen begins as a chain of abstract data. Campbell abstracts photographically captured imagery using discreteness and low resolution to interrogate the notion that computational imagery must always produce a seamless virtualization of a three dimensional world.

What I have shown in the preceding arguments is the way in which theories of abstraction have united with theories of modern technology, from the mechanical to the computational, to produce a particular mode of representation: technological abstraction. Technological abstraction has a lineage that extends beyond the advent of computers; after the invention of modern computers, it is evident in work produced using mechanical, analog computers and later, digital computers. These works deploy the same machines used to generate immersive virtual worlds, but utilize that technology towards very different ends. We should not suppose that computational abstraction emerges simply because computers were not yet able to construct virtual worlds, but rather that it arises alongside a fascination with a computa-

tional universe, governed by the same physical rules as the human body, but adhering to a different perceptual order, one which favors pure relations, patterns of data, and elemental forces, and into which we are ushered via the screen, with its array of points of pure light and proliferation of digital units.

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INVESTIGATING THE DIGITAL SUBLIME THROUGH PHOTOGRAPHERS' VIEWS OF REALITY: A CASE STUDY OF NATHAN BAKER'S OCCUPATION PROJECT

YI-HUI HUANG

The digital sublime refers to digital-composite photography that presents the existence of something unrepresentable. Dissatisfied with the representation of the outer world, sublime photographers are compelled to create personal versions of the world. To better understand these photographs, I propose that we investigate the artist's views of reality. This paper cites Nathan Baker's project *Occupations* as an example.

Introduction

The concept of the "sublime" has been discussed by a few philosophers. According to German philosopher Immanuel Kant (1724–1804), the sublime refers to something "absolutely great" [1], such as the vast Saharan desert or an earth quake, that surpasses one's ability to comprehend with one's reason. The sublime brings a mixture of anxiety and pleasure to those experiencing it: anxiety from the conflict between reason and imagination, and pleasure from the awareness of the supremacy of human reason. While Kant focuses on sublime nature, French philosopher Jean-Francois Lyotard (1924–1998) concentrates on sublime art, such as avant-garde art, which presents "the existence of something unrepresentable" [2] and that confronts us with the limits of our ability to reduce the world to rational concepts.

More recently, the term "sublime" was used to indicate a new type of photography. With the rapid advancement of technology in the photographic industry, more photographers, such as Jeff Wall, Pedro Meyer, Barry Frylender, and Loretta Lux, have been relying on digital facilities and embracing the style of digital-composite photographs. Using computers to combine pieces of images, digital-composite photography requires a new method of production and renders a matchless look – a sophisticated fabrication, a perfect and clean composition, a maximum color saturation, a multiple-point perspective, and stunning or newfangled content – which is often referred to as the "digital sublime" [3].

This paper investigates what "unrepresentable" entities the digital sublime attempts to present. Dissatisfied with the representation of the outer world that can be easily accomplished by pressing a single shutter button, photographers who painstakingly synthesize images together to create the digital sublime seem to be compelled to create personal versions of the world, which may be closer to the beliefs through which they interpret and interact with the world.

To gain a better understanding of these photographers' digital sublime photographs, I investigate the photographer's worldview, or what s/he values as knowledge. As contemporary architectural theorist Mark Gelernter (1995) suggests, knowledge is the foundation of one's intention, ideas, and thus, forms of artwork [4]. If we understand how a photographer sees the world, we can have a better idea about the principles that guide his or her artmaking. A more approachable way to inquire into a digital photographer's knowledge is to ask about his or her view of reality [5] with questions such as "What is your definition of reality?" "What notion of reality do you represent in your photographs?" and "How do you visualize your reality in photographs?" After knowing their layers of reality, the deepest and the most

sophisticated layer can be considered as their knowledge, which may explain the “unpresentable” substance presented to viewers.

As an example of how we can understand a body of digital sublime work, the following section cites the photographic project *Occupation* of Nathan Baker. The discussion of Baker and his work is primarily based on an interview I conducted with him in December 2006 in his studio. In addition, I referred to Baker’s artist’s statement as well as consulting other critics’ evaluation of his work.

Herein, I first introduce Baker’s process of photographic creation, including his initial feelings, thoughts, ideas, and finally, the actual production. I then relate his definition of reality, and strategies he employs to visualize reality in his photographs. Next, I interpret Baker’s multiple layers of reality and cite suitable theory, realism, to explicate her work. Last, I conclude with the knowledge provided by Baker’s photographs, from which we can gain a better understanding of his art.

Baker’s Occupation Project

In his project entitled *Occupation*, Nathan Baker, a Chicago-based artist, produces composite photographs that express the labor one puts into one’s job. By condensing various tasks required by a job into a single frame, Baker evokes “the frenzied tedium of a wide variety of occupations and the intensity of effort that people put into them” [6]. The *Occupation* project consists of twenty photographs, each presenting one job at a workplace, and hence describing twenty occupations ranging from scooter repairer, house painter, to hotel housekeeper.

Baker explains that his initial idea to produce *Occupation* was from a negative perspective. It was later, from viewers’ responses concerning the humanity shown in the photographs, that he started to look at the occupations positively. Coming from a lower-income working-class family where money was always an issue, Baker learned that jobs have occupied most people’s lives, and that people devote incredible amounts of energy, effort, and time only to benefit other people. In turn, what they gain is mostly contempt or mocking of their “circus-like bodily performances” [7]. However, viewers see this project differently: esteemed humanity outweighs other messages. Therefore, intentionally or unintentionally, Baker demonstrates the tension between the disgraceful and dignified natures of a job—its skills provoke scorn, though they deserve respect.

Baker articulates his production of these images. All of the twenty occupations are working-class, which reflects a lot of labor and specific manual skills. The stationary camera is usually positioned higher to render a full view of the whole space as well as the details of every task. In addition, the faces of the workers are intentionally sheltered or side-viewed to avoid viewers’ quick recognition of the fact that it is the same person at work in the final images. This strategy prevents Baker’s seamless digital composites from being immediately read as unnatural Photo-shop collages. His ultimate purpose in de-emphasizing the Photoshop techniques is to make his photographs documentary-like.

To improve the believability of his documentary, Baker utilizes photographer Robert Frank’s (b. 1924) “filmic style of photography” [7], where photographs are composed in a seemingly casual way by intentionally leaving some part out-of-focus. This style imitates the visual habit of glimpsing as if one is looking at the actual scene. By implementing this filmic strategy, Baker invites viewers to enter the scene, or

makes them feel that they are present in the situation where the photographs were taken. In Baker's opinion, the more viewers can bring themselves to the scenario, the more believable the photograph is. For example, Baker incorporates a blurred arm in the left side of the frame in *Casino Boat Engine Room* to create an illusion that viewers are actually present in this space and watching these workers.

Despite embracing Frank's strategy of filmic documentary, Baker says that a single shot was not sufficient for him to describe something thoroughly. He then realized that when putting together all these single shots of the same person digitally, he was able to communicate more facts about the job so as to achieve "a real representation" of it. Because each shot was taken in real time and in a real space, the final images are still considered documentary. However, in Baker's terminology they are more than traditional documentary; they are comprehensive documentary. Baker has described each occupation as fully as he can within the framework of the medium of photography, and since he directs people to perform the tasks of their jobs, he also calls his project "directorial documentary" [7].

Baker tends to investigate a subject by showing concrete objects associated with the subject. For example, in his previous project *Tangible Mediation*, he showed an individual and an object the individual chose in each photograph. By closing the eyes of each individual, he directed viewers to see the objects first, and then ponder the relationship between the object and the subject in order to sketch the identity of the subject. For Baker, objects are "mediators that provide both personal and societal representations of individual identity" [7]. In other words, in Baker's view, a tangible object from the outer world serves as an important clue to understanding what is going on in a person's mind.

Baker succinctly defines his view of reality: "My definition of reality is one's experience, which is composed of a physical component and an intellectual component. Those two things compose one reality" [7]. According to Baker, the physical component comes from his five senses, and the intellectual component indicates his thought or idea that responds to the sensory stimulation. Following this criterion, Baker's *Occupations* represents a reality for him. On the one hand, it presents his experience of actually taking pictures of these people. On the other, it demonstrates his ideas of comprehensive documentary, which thoroughly describe twenty occupations.

Baker also asserts that his photographs carry multiple types of reality to viewers. The first type is the physical reality of the pictures itself. The second type presents each figure performing in real time and in a real place and was recorded as snapshots. The third type, even more real than the second, shows a multitude of figures co-existing in an invented space, and contains fuller information. The last type is the metaphoric references or visual connotation that makes viewers think about the ideas behind the pictures, or different mental places that viewers go individually.

Theoretical Understanding of Baker's Work

Based on Baker's assertion that two components constitute his reality, his view of reality can be explained as two-layered. The first layer comes from the five senses, and the second is the idea or thought provoked by the sensory. Thus for Baker, coming from the most sophisticated layer of reality, knowledge is ideas derived from sensory experiences, and such a view renders Baker a realist.

According to British realist philosopher John Locke (1632-1704), objects exist in the external world independent of the mind. In some circumstances, when these objects act upon the senses, a stimulus is transmitted from the senses through the nervous system, and eventually gives rise to a mental

process—the conscious perception of the object [8]. The idea of the object thus derives from the faculty of understanding which abstracts, systematizes, orders, and abbreviates the data of sense. Locke also explains that the mind is like a camera; when it is passively acted upon by external objects and receives stimulation, the mind, or the camera, registers ideas that reflect and resemble these objects. For Baker, the sensory and ideas rely on each other and are indispensable components in the formation of his knowledge.

Baker's ordainment of the four types of reality given by his photographs can actually be categorized into his two layers of reality. The first and the second, respectively the physical reality of the picture itself and the fact that each figure exists in front of the camera in real time and space, are physical realities where viewers can touch and see their existence. The third, where multiple figures coexist in an impossible plane, comes from Baker's idea, which results from solving the problem of how to bring more information into photographs to provide a complete illustration of his view. Finally, the fourth is viewers' mental states or individual interpretations of images. Echoing contemporary philosopher Kendall Walton's (1984) assertion of "transparent photographs [9]," Baker contends that when viewers look at his photographs, they not only see the pictures themselves, but by seeing through photographs, they literally see figures photographed. In addition, viewers capture Baker's creative idea of putting figures all together, as well as giving rise to their own meaning about the photographs.

Baker's *Occupation* corresponds to Aristotle's (384 BC – 322 BC) description of mimetic artwork, which is considered the first theorization of realist art. First of all, *Occupation* does not only represent the particular event of a person at work, but illustrates occupations in general, such as hotel housekeepers. Baker presents a normative idea of what an occupation *ought to be* from his own point of view.

Secondly, the basic components within the final images are acquired from the world; that is, they are all what one can observe with the naked eye. It meets Aristotle's emphasis on the use of the senses, and on the empirical observation yielding certain and clear knowledge of the world. In addition, Baker's attitude toward the subject matter is not fantasizing, disdaining, or criticizing, but is fairly and objectively displaying what a job consists of. Also, his manner of presentation is not prejudiced, distorted, or idealized, but is impartially describing what he sees about a job from his own perspective. In other words, the subject matter of people at work is the primary concern, while his judgmental expression is secondary.

Thirdly, an important criterion for Aristotle in art is the dispensability of form and content. Baker's strategy of repeating an identical person at work does not derive from a formal concern, but is crucial to the articulation of his idea: the tension between the complex skills an occupation can involve and the entertaining bodily performances an occupation requires. In Baker's view, his strategy also serves to describe an occupation fully by bringing in more information. This information does not come from Baker's subjective inner world, but is from his experience of interacting with the world. Alternatively put, for Baker, to describe something fully is to provide all that he can sense, and what an occupation means to him is comprised of what he can experience visually. Consequently, for example, a job is depicted by using thirty-six decisive moments, which are simultaneous form and content.

Lastly, similar to Aristotle's articulation that the intent of mimetic drama is to give pleasure, Baker urges viewers to contemplate pleasure from viewing his well-planned photographs. Condensing various bodily gestures at work, Baker highlights the amusement from watching circus-like performances. This pleasure requires viewers' cognitive operation of the mind. Viewers can understand this humor as long as in the real world they have ever seen similar presentations.

Baker's work is also subject to realist explorations in general, and hence provides realist knowledge. His comprehensive documentary stresses the resemblance of the representation in synthesized photographs to what, in his view, is actually happening in the real world. The verisimilitude of his depictions gives a vivid sensation of seeing those workers in everyday life. By arranging them realistically so as to make use of the believability of documentary photographs which dictate a real time and a real place, Baker's viewers tend to consider the workers as, indeed, being in front of the camera. However, what makes *Occupation* different from normal documentary is its more-than-usual amount of true information about what it depicts. This motivation of adding more factual and pertinent information has made *Occupation* realist [10]. Consequently, Baker's realist knowledge provided by his photographs dwell in the window on the world, which presents the likeness of what occupations really are. By including more data and keeping the combination seamless, Baker has polished the window itself so as to let it contain a richer view.

Baker's strategies to visualize occupations correspond to his realist worldview. Whether in *Tangible Mediation* or *Occupation*, his realist intention is to illustrate a person through objects around him or tasks he encounters. That is to say, what accounts for a person or an occupation is situated in the outer world. To understand a person, Baker resorts to an object the person picks; to know more about a job, he compacts a variety of tasks into photographs. Along the same vein, *Occupation* is composed of a culmination of multiple documentary photographs, which no doubt originated in the external world. After gathering components from the outer world in the form of documentary, it was Baker's faculty of understanding at work to systematize, abstract, and abbreviate data, and then generate the idea of multiple figures in one image. The final result is the comprehensive documentary which surpasses documentary's limitations, while preserving its nature. Influenced by but different from Robert Frank's filmic style, in which "the image seems boundless, not contained within the rectangle of the frame, but stretching beyond it," Baker's composite photograph is literally a film, which stretches beyond one single decisive moment and records the whole process of time and tasks associated with the job.

The directorial ingredients in *Occupation* do not interfere with its realist essence. In theorizing the directorial mode in photography, critic A.D. Coleman (1998) asserts that the directorial elements have played a part in a large number of documentary or straight photographs, including those of photographic image-makers who title themselves documentary champions. In *Occupation*, the authenticity of the original event is not an issue; rather, it is the general idea of what an occupation consists of that anchors the subject matter. Therefore, no matter how the scenes were constructed, how workers were directed to perform their skills, or how many pictures were condensed in a final image, Baker's realist perspective remains the same, where he acquires knowledge about occupations through his experiences and presents what he has observed with his senses to viewers, who then gain the same knowledge. All of the directorial efforts were made only to describe the given object or event fully, rather than to impose Baker's emotional impulse from his inner to alter the given knowledge from the outer world.

Conclusion and Implications

Investigating digital photographers' views of reality helps identify and clarify the valuable knowledge they communicate in their work. In Baker's sublime photographs, we can find two layers of reality: the sensory stimulation and his understanding of it. In *Occupation*, he exemplifies realism. The knowledge he provides to viewers and the "unpresentable" substance that his photographs try to present reflect his perspective of a detailed, true-information-laden, and believable representation of those occupations in the real world. By making his photographs resemble the world, Baker urges viewers to look into the

drama screened in paper film, and to contemplate the dignity and humor that transpire from the human figures.

Students of photography need a deeper understanding of the nature of digital-composite photography before they select it as the medium for expressing their ideas. In order to appreciate and teach about the digital sublime, photographic educators need to be aware that the digital composite may deliver a variety of aesthetics and knowledge, which may encompass modernism and postmodernism so as to incorporate pedagogies that address both the appreciation of fine arts and the critique of visual culture in classrooms.

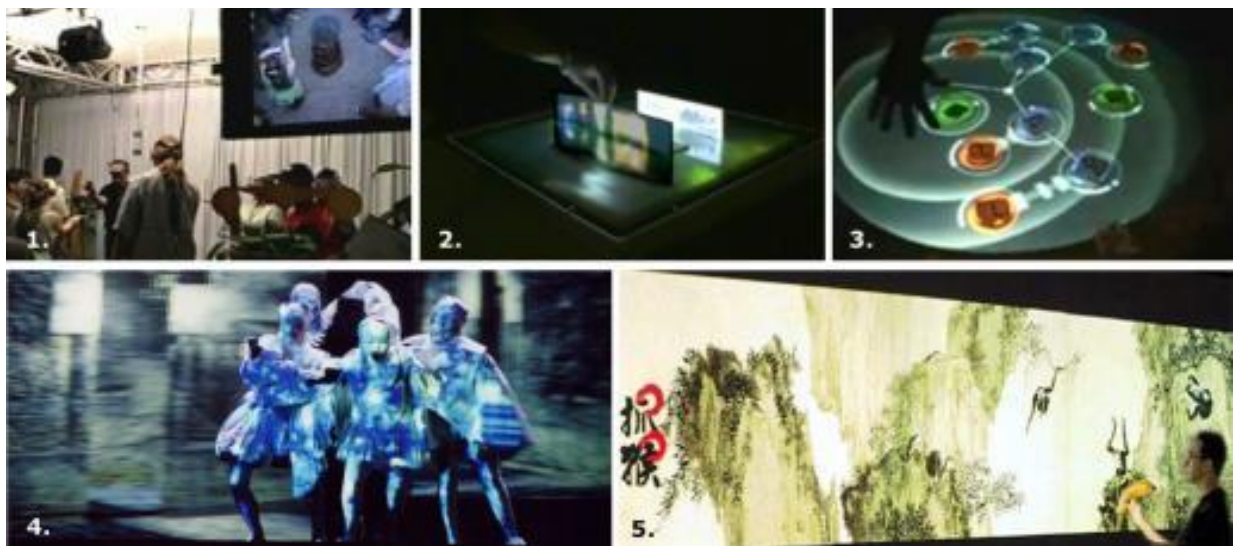
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DIGITAL RE-PRESENTATION AND SIMULACRUM IN AUGMENTED REALITY

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This paper presents new definitions of digital re-presentation, simulacrum and pleasurable design for augmented reality (AR). We use this definition to survey some recent digital artworks. We move from AR to digital re-presentation, building on Baudrillard's ideas. Digital information processing can amplify AR, allowing virtual objects and virtual reality to join together. It makes a simulacrum world in which we can take pleasure in immersing.



*Contact Water (2001) Fig. 2. Tablescape Plus (2006) Fig. 3. ReacTable (2006)
Fig. 4. The Jew of Malta Opera (2002) Fig. 5. Immersive Chinese Painting-The Ten Gibbons (2005)*

Examples of Digital Re-presentation in Augmented Reality

This section gives examples of the application of digital re-presentation and augmented reality in digital art. In each of the augmented reality system described below, an object acts as a “marker” for projecting or recording information for the augmented reality.

- **Augmented Reality in Interactive Entertainment**

Art Digital entertainment art contains the potential for teaching and pleasure. Artist Taisuke Murakami's *Contact Water* was presented at SIGGRAPH in 2001. [3] Participants donned head-mounted displays and hand sensors, and were able to virtually take a miniature dolphin out of a central pool, and pass it to other participants (Fig. 1). This interaction was both fun and an example of augmented reality. A digital re-presentation of each dolphin was projected onto the hands (marker) of participants. The participants were able to use their hands to transfer the virtual dolphin re-presentation to other viewer's hands, creating a sensation of virtual physical touch.

- **Augmented Reality in Interactive Story Animation** Augmented reality can advance animation from passive to active participation. Tokyo University's *Tablescape Plus* [4] used augmented reality in interactive story animation (Fig. 2). This work projects animated characters and scenery onto real objects marked on a tabletop display, using a camera which can recognize objects (markers) on the tabletop display. When the participant puts marked objects close to each other, the characters react to each other, as if in a movie. The user's operation is the key step in the digital re-presentation of these cartoon stories. By creating conversation among selected object, *Tablescape Plus* enhances the sense of exemplary viewers' involvement, and shows the fun in the stories. The audience can enjoy the story animation and have intellectual and emotional pleasure.
- **Augmented Reality in Interactive Visual Art**
Visual art transmits the artist's idea visual impact. Interactive effects can improve art works and deepen the impression of the audience. Clara Boj and Diego Diaz's *AR Magic System* [5,6] records participants' faces (markers) and exchanges the faces with different bodies in a screen projection (See the URL at reference [6] for an image from this artwork.) This "digital re-presentation" causes a strong visual impact and a funny confusion of identity exchange.
- **Augmented Reality in Interactive Sound Art**
Sergi Jordà at Universitat Pompeu Fabra used augmented reality in his 2006 *ReactTable*. [7] *ReactTable* is a collaborative musical instrument. People place different blocks (markers) on the table to control musical loops and filters (Fig. 3). These interactive sonic displays allow participants to feel relaxed and enjoy an interactive musical performance of the digital re-presentation.
- **Augmented Reality in Interactive Opera**
Performance Augmented reality has begun to be applied to interactive performances. Germany's ART+COM used augmented reality in the stage setting and costume design of the opera *The Jew of Malta* premiered at the Opera Biennale Munich in 2002. [8] Both the furniture (markers) and all other aspects of the stage were white, as was the costumes (markers) of the actors. Using tracking technology and gesture-based control, the system projected images onto the stage setting and costumes – a milestone in using augmented reality in opera (Fig. 4). This production also broke down the fence between stage design and costume design. Through digital re-presentation created plentiful dramatic effects and different morphological visual images projected onto the stage and costume design.
- **Augmented Reality in Interactive Digital Archives**
Recently, digital archives have been used in interactive art and become a vital part of culture preservation. It creates new opportunities to teach, create interest in, and present historic artifacts. We have used augmented reality technology in our 2005 work *Immersive Chinese Painting-The Ten Gibbons*. [9] Pu Hsin-Yu (1896-1963) painted *The Ten Gibbons*, which today is owned by the Taiwan National History Museum. We used augmented reality technology and infrared cameras to allow the participant to move a banana with his hand to attract the gibbons to the original position in Pu's painting (Fig. 5). The sight of the gibbons hanging on the trees or standing in a valley presents a humorous visual "digital re-presentation".

Simulacrum World in Augmented Reality

Patrick Jordan's 2000 book *Design Pleasure Products*, argued that producing pleasure products is a central function of design. [10] Jordan's book is a response to the same motivations as augmented reality –

pleasure is the central goal. Canadian anthropologist Lionel Tiger presented four concepts of pleasure in his 1992 book *The Pursuit of Pleasure*. [11] Tiger's four concepts play an important role in designing augmented realities:

- Physio-pleasure: This pleasure comes from the sense of perception organ, including the sense of touch, taste and smell. *Contact Water* is a good example of physio-pleasure in augmented reality.
- Socio-pleasure: This pleasure comes from the interactive relationship between oneself and others. *AR Magic System* is a good example of socio-pleasure in augmented reality.
- Psycho-pleasure: This pleasure comes from emotional reactions. The design should be able to cause cognitive emotional reaction. *Tablescape Plus* and *Reactable* are good examples of psycho-pleasure in augmented reality.
- Ideo-pleasure: This pleasure comes from people's values and their sense of knowledge. *Tablescape Plus*, *The Jew of Malta* and *Immersive Chinese Painting-The Ten Gibbons* are good examples of ideo-pleasure in augmented reality. The works teach and encourage participants to speculate and learn.

Augmented reality technology makes virtual world and real environments meet each other through digital information processing. It creates "digital re-presentations" and "simulacrum worlds," and also creates a new language and direction in digital art.

French sociologist Jean Baudrillard's *Simulacra and Simulation* argued that reality has been displaced by symbolic simulacra. [12] Baudrillard thought that the world simulated by media is more "real" than "reality," creating a "hyper-real" world, in which it is difficult to distinguish the real and unreal.

This paper discusses how in the digital era people become conscious of and interact with reality and simulacra, through the pleasures of art appreciation and immersion. By analyzing the media and form of augmented reality, we have new ways of discussing "simulacrum" and "re-presentation". Augmented reality uses information processing to deconstruct, transform, and re-combine, creating digital re-presentations and simulacra worlds where virtual images and reality coexist, enabling people to perceive hyper-reality. For example, *AR_Magic_System* processes people's faces to create "face re-presentation" and "identification re-presentation." It creates a hyper-real identity in a simulacrum world generated through augmented reality, and participants can become immersed in this simulacrum world by viewing and interacting with the art.

Conclusion

The origin of Jean Baudrillard's *Simulacra and Simulation* lies in the age of television, and it takes at times a cynical view of simulation in society. Baudrillard's concept of re-presentation mostly focuses on negative messages re-combined by the media and to create a simulacra world which transcends reality.

In contrast we take a more optimistic attitude. Augmented reality creates "simulacra world" in which we can take pleasure in immersing. Its re-presentation can stimulate participants (exemplary viewers) to think further about the purpose of the creators in using virtual information to project onto or replace real objects. By selecting and transforming virtual markers, augmented reality builds a complete different frame of mind and atmosphere. By interactively mixing simulacra and reality, participants can derive pleasure and enjoy the interactive feedback from the artwork.

In this paper, we simply point these concepts. We hope more discussions will be presented in the future.

Acknowledgments

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BELOW THE BELT – PARTICIPANT EXPERIENCE IN A BREATH CONTROLLED INTERACTIVE ARTWORK

Jiann Hughes

Contemporary theories of embodiment and affect are explored in relation to the breath-responsive interactive installation, *Below the Belt*. The artwork uses bio-sensed data to measure the breathing patterns of participants in an attempt to uncover the relationship between breath and emotion. The artwork forms the test-bed in an examination of how emotion and breath are considered in the construction of experience across bodily and social realms.



Fig. 1. Below the Belt, 2011, Jiann Hughes, photo- graphic media, Copyright Pia van Gelder.



Fig. 2. Below the Belt participants, 2011, Jiann Hughes, photo- graphic media, Copyright Pia van Gelder.

Introduction

Despite the development of body-responsive interactive art the vast majority of artists and researchers working within this genre have explored embodiment from an external perspective, privileging the senses of the outer body or the proprioceptive sense of the body in space. Few have examined perceptions of the inner body. Where the inner senses have been used to drive the work the participant's focus has often been directed towards self-reflection and their affecting relationship with the social sphere has been ignored. When the affective nature of social interactions is considered the works have commonly bestowed a pacifying and subdued meditative tone.

The interactive installation *Below the Belt* is a breath-responsive artwork exploring how the aesthetic experience of engagement with breathing and emotion can promote an awareness of embodiment. It amplifies the breathing patterns of participants to extend their expressive and perceptual awareness and their connections to the inner senses. Often we only become aware of these senses when we become unwell. This can lead us to alienate the body further in an attempt to dissociate ourselves from the discomfort, and so detachment becomes a habit. This work examines how breath awareness can subvert our customary tendency to favour the outer body above the inner body by magnifying our perception of our inner world. [1]

Below the Belt provokes the participant to explore the broader relationship between their breath, emotions and the social realm. It stretches their focus beyond their fleshy boundary to bring awareness to the subtleties of the affective relationship between these bodily responses and their social interactions. The primary motivation of this work is to take the lived experience of breathing out of the private realm and into the public. It attempts to understand participants' first hand accounts of their experience using a phenomenological approach as a way of focusing on the whole bodily being.

In this paper I briefly explore theories of embodiment and affect to assess the role that emotion and breath play in bodily and social domains. I continue by positioning this work in relation to other breath-focused interactive artworks before providing some context to the work itself. The paper concludes with reflections on the experiences of a selection of the participants who encountered the work and on how these findings are informing my ongoing research in this area.

Embodiment and Affect

Contemporary approaches to the study of embodiment and affect theory sustain inquiry into lived experience, subjective perspectives and meaning making. The existentialist phenomenological tradition questions the dualistic nature of Cartesian thought that bifurcates mind and body. In *Phenomenology of Perception*, Maurice Merleau-Ponty explained perception as bodily experience where the body is subject distinguishing between the objective, physiological entity of the body and the phenomenal body that we experience the world through. [2] However the term embodiment is still often misused to describe the body's role in cognition while still maintaining the Cartesian paradigm. I believe embodiment is the very nature of being and the primacy of the body in constructing experience.

Medical anthropologist Margot Lyon suggests that because the experience of embodiment is accentuated when we are emotionally present in the world, we can study embodiment by studying emotion or a bodily capacity linked to emotion, such as breath. [3] The respiratory function is related to feeling in part because of the nerve fibres it shares with the autonomic nervous system, which plays an important part

in emotion. For example, slow, deep breathing can regulate the functioning of the autonomic nervous system by increasing parasympathetic activity (rest and digest responses), effectively bringing the involuntary autonomous nervous system into the realm of the voluntary. This argument does not attempt to diminish emotion to the function or arousal of breath. It acknowledges that behaviour cannot be reduced to physiological processes and makes no attempt to match feelings with particular breathing patterns.

It should be noted that whilst embodiment and affect theory has only recently been articulated by Western scholars it has of course been studied through practice based research for many centuries by philosophers of Eastern traditions who have used breathing practices and meditative states to reflect on states of consciousness.

Body-responsive Interactive Art

Body-responsive interactive art is entirely reliant on the actions of the participant, which becomes the instrument of communication. The participant responds to the work through their embodied reactions, the work reinterprets this feedback and so the dialogue unfolds. Their aesthetic experience is defined not in terms of beauty but rather through their experience of this interaction. It is this experience that creates meaning for the work. Body-focused interactive artworks provide a unique platform to engage in dialogical exploratory practices.

As biofeedback technology has emerged, so have creative ways of engaging with digital breath-focused interactive artworks. Below the Belt is situated amongst works that are activated by breath such as George Khut's work *Cardiomorphologies v1*. [4] My research looks beyond the self-reflective aspects of this focus to the broader affect of breath on the social realm. Works being created in this area include Christa Sommerer and Laurent Mignonneau's *Mobile Feelings*. [5] Also Thecla Shiphorst's wearable body architecture *Whisper*, which uses breath to explore human interactions in the social domain. [6] Where as most artists working in this area have focused on the meditative aspects of reflections on their work I am interested in provoking a broader range of responses from participants to allow them to more fully explore the complex relationship between their breath and emotions. The artwork *Below the Belt* provides the 'black box' in which to examine these theories.

Below the Belt

Below The Belt is an interactive installation that affords participants the space to feel the affective nature of emotion, and its role in human experience, through the prism of breath. It attempts to re-embodied interaction within video installations, to amplify and extend the bodily experience of participants. The installation uses affective computing and the breath of participants as the vehicle to explore embodied subjectivity. It places embodiment theory and the affecting influence of emotion and breath centre stage, directing participant attention to their breath to explore how it is affected by the instruction. The participant is presented with a playful environment to experiment with breathing techniques and an opportunity to cultivate their breathing literacy. Participants interact with breathing coaching Tony, made visible through a single channel projection, who guides them to slow down their breath and increase the natural rise and fall of their abdomen.

The installation relies on wearable computing to make Tony's instruction audible – protective boxing headgear, implanted with wireless headphones, provide an immersive auditory environment blocking out extraneous sound and focusing the participant's vision on the projected video. A biosensor embedded in a champion title-boxing belt wirelessly relays the degree of stretching to an Arduino microprocessor attached to a laptop. The microprocessor feeds this stream of data to Max/MSP software (Cycling 74), which identifies patterns in the data attributable to the pace of breathing and degree of abdominal movement. The laptop, visible directly under the projected video image, displays the Max patch, the guts of the processing driving the work. This includes a simple graphic representation of the participant's pattern of breathing.

The first stage of the encounter involved attaching the belt, immediately drawing the participant's attention to their upper abdomen, the region under measurement. Tony then spends the first minute setting the scene and explaining the rules of engagement. During this time a baseline is calibrated for each participant according to her or his breath patterning. The participant's overall performance is judged according to deviations from this baseline. Thereafter, at regular intervals the average value for the preceding period is calculated and compared to the participant's previous results. These differential values are fed to Jitter software which triggers the appropriate video vignette of Tony's feedback. The work does not attempt to make judgments about the participant's natural breathing patterns as performance is measured in terms of changes in the pattern of breathing during the encounter.

The breath coach, Tony O'Loughlin, is actually a boxing coach from Elouera-Tony Mundine gym in Sydney. Tony's antagonistic coaching style starkly contrasts with instruction found in the more popular meditative breathing practices. He takes each participant through five rounds. After each round he provides feedback, often harsh, on their breathing performance for that round, based on the Max patch results, and offers appropriate breathing exercises to improve performance in the next round. At the end of the five rounds the competitor's overall performance is calculated and Tony proclaims their performance with all the fanfare of a championship bout. Tony's aggressive motivational style was chosen as a way of provoking a reaction that is at odds with the calm, smooth breathing he demands. The participant has the challenge of obeying instruction to relax and breathe deeply, delivered in a forceful and abrasive style. The natural body response to this harsh feedback for some may be an increase in their nervous system's sympathetic responses leading to shallower, faster breathing.

Through the metaphor of boxing the work examines the tensions between competitive contact sports and the inward focus of supportive breathing practices. It plays with the constant mediating role that breath plays in the bodily and the social realm. While the participant is sensing and performing their responses they are also differentiating and appreciating the systems interpretations, in the full knowledge that they are being measured. Although the work relies on rhetoric grounded in competition the reality is that each participant is only ever competing against herself or himself, never with each other. The irony is that when participants get caught up in this sense of competition the natural reaction of the body is to retreat to flight or fight mode which produces shallower, faster breath consequently impairing their performance.

Understanding Participant Experience

When John Dewey redefined aesthetic experience, he contended that the work that art does takes place within the entire process of art making. Art is more than the material 'work of art', it is the development

of an experience and recognises the aesthetic experience in everyday living. Pragmatist aesthetics elevated the experience of the audience as a vital component in completing an artwork. It proposes that to fully assess any work of art the experiences of those who interact with it must be considered and understood. [7] This philosophical position supports the dialogical aspect of my inquiry that seeks to understand the lived experiences of participants interacting with this work.

There is very little empirical research on audience experience of interactive art. [8] Whilst various literature has examined participants' creative engagement with body-focused interactive artworks these approaches have mainly used third person investigations which rarely examine the physical, emotional and affective experience. Where they have taken into account the quality of experience they have often employed methodologies that take an embodied cognitive approach, which maintains that the mind is split from the body. In addition purely first-person accounts of participant experience can easily be dismissed in academic realms as anecdotal, unless they have been rigorously interrogated. My exploration is motivated not just in attempting to understand the experience of interacting with the artwork but also in seeking to understand the participant's interoceptive exploration. This area has been neglected, perhaps due to the difficulty of articulating experiential response, yet it remains central to the way in which we interpret and understand an artwork. The phenomenological approach used in this investigation recognises the body as our basic mode of being in the world in terms of both the process and practice of this research.

The relational practice that grounds this work seeks to develop dialogue between the participants, their audience and the artist. Seeking to understand their experiences during their interaction with *Below the Belt* led me to enter into research-focused dialogues with seven randomly selected participants. Unstructured interviews, conducted immediately following the encounter, used open questions to initiate a conversation about the experience. Participants were asked to recollect their thoughts, feelings, perceptions and sensory memories of the interaction. More specific questions followed, focusing on observed body language, gesticulations and breathing quality.

Reflections

A selection of participant quotes are found below along with a brief description of the themes identified in these responses.

BREATHING LITERACY

The diverse quality of participants' connection to their breathing is illustrated by the following statements:

S1: "I never think of my breath, it's just kind of always there".

S3: "Tony's advice was at odds with the instructions I was given as a kid with asthma. I used to be told to breath into my chest and not into my belly. That new logic was really hard for me."

ENGAGEMENT

Participants chose to engage with the artwork in a variety of ways as described below:

S2: "I got swept up by the competition. I got heavyweight but I found myself quite anxious and tight in the process. Although I fooled the system I feel like I cheated myself".

S4: "About half way through I could see the graph on the laptop and figured it was my breathing. I hooked on to it for the rest of the time".

PARTICIPANT CO-EXPERIENCE

The social aspect of this seemingly solitary pursuit was perhaps impacted by the competitive tone of the work. Some took the opportunity to perform to their audience – on a number of occasions the participant, on stepping out of the installation, would announce to their 'audience' the title Tony had given them, often in the same flourishing style he had used.

S2: "I was determined to beat my girlfriend – she got super-heavy weight."

The challenge for both interviewer and participant in understanding these encounters is the limitation of words to describe an embodied experience. This required attentiveness to all the forms of communication used by participants in relaying their experiences. They were encouraged to verbalise their body language and take time to unearth meaning where there was ambiguity in their language. Overall, participants reported an appreciation of the opportunity to have their breath foregrounded in this way.

Some participants struggled to recollect aspects of their encounter. It is intended that future studies employ the video cued recall method to support participant memory. The audiovisual nature of this medium honours the temporal, embodied and emotive nature of the artwork and captures the participant's body language, gesticulations, breathing quality and tonal subtleties of voice.

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GAMES: FROM BLOCKBUSTER ENTERTAINMENT TO IRREVERENT EXPERIMENTS AND LOVELY BASTARDS

LYNN HUGHES

This paper presents games as the post-cinematic cultural form. In the era of powerful accessible tools and internet enabled distribution, there are broad questions about what and why (high?) art is. What is clear is that the increasingly broad field of games already includes everything from blockbuster entertainment through serious games to 'games d'auteur' and experimental forms such as the five examples presented.



Propinquity: 2010–11, Lynn Hughes and Bart Simon with team, Custom wearable sensors and interactive visuals. Photo: Brian Li.

In the contemporary art world, even in the new media sector, games are often still caricatured as 'mere' entertainment - somehow essentially superficial. They are at best a minor mode or a trendy margin. But I am interested in games because I think they are absolutely central -formally, technologically, socially and artistically. Indeed, it is becoming increasingly clear that, in the way that cinema was the central cultural form of the 20th century, games are the central form of our time. [1] This is not to downplay the persistence or importance of other inherited or current forms of art, it simply describes the contemporary, cultural state of affairs.

I would characterize the centrality of games in two ways.

The first is formal: current post-cinematic culture is the culture of the computer rather than the camera and, by implication, of active rather than passive relationships between audience and cultural product.

Computer and network-enabled interactive media imply a designed relationship between a closed, authorial shape (typical of, for example, painting, photo or cinema) and a more open, participative space. The participative space is still a designed one but is open, to one degree or another, to user choices or paths and may have emergent qualities - whether deliberate or unanticipated. [2] While this is generally true of interactive media, digital games articulate this relationship in a particularly explicit and clear way so that we can see them as the definitive form of interactive (digital) media.

A, perhaps more compelling, description of games puts the emphasis on the notion of exploring a system. Playing a game leads us to discover an underlying, constructed / designed system with its affordances and assumptions. [3] In a nutshell, games stem from, and point to, the world as increasingly systematized and they ultimately suggest that we need to be both aware and critical of the implicit, constructed and systemic nature of our realities. Here again games can articulate in complex, critical and compelling aesthetic ways, key contemporary preoccupations and situations.

Beyond these formal arguments, it seems essential to point out that people who dismiss games, or rather don't see them, almost always have little or no playing experience. Perhaps even more importantly, they have little idea of what the field of games looks like, even at this relatively early point in its development, in terms of breadth, depth and variety. To a significant extent this is simply because of the pace of development. Games have really developed over about the last forty years and the acceleration of development after 2000 was matched only by the revolution in approach and audience in the last two or three years. Most art critics and curators are over forty and so it is not surprising that they don't understand games. To them, games are the violent blockbusters that all look about the same, along with, perhaps, the recent addition of lightweight family entertainment for newer controllers like the Wii, Move and Kinect. A few curators are becoming aware that there is an art fringe to the game community. But art games or game art are just a margin of what is already a very rich, varied, artistically and socially exciting arena. It is already clear that the field of games will soon look very much like cinema in that it will include everything from blockbuster pure entertainment (like Hollywood, much of it repetitive and uninventive but occasionally something both commercial and good) through games d'auteur, to low budget independent and experimental genres.

Even a book like *Gamescenes* [4] makes the mistake of seeing the games industry as relatively monolithic and, while this may partly be because it was published in 2006, it is also because it looks at games through an art / not art lens that is essentially rooted in the fine or visual arts. In his introduction, Matteo Bittanti suggests that games cannot be art because they have too big an audience (!) [5] Like much cinema d'auteur and experimental cinema, independent and experimental games also (usually) have smaller audiences.

At the same time, games' very centrality is firmly linked to a digital culture that is radically questioning who makes art and for whom. As David Robbins suggests in his collection of essays called *The Velvet Grind* [6] the rapid and radical democratization of access to sophisticated networks and digital tools has already enabled a culture of 'amateur,' users and assorted individuals and groups, who even a decade ago would not have had access to the means to both sophisticated production and distribution. [7] In the games industry this is leading to rapid development of the independent sector as alternatives paths - from individual, to micro and small, development studios- become viable. Arguably more viable than the ungainly mega studios.

As a corollary to the increasing accessibility of sophisticated, affordable tools for creation and distribution, many polarities supported by more traditional social and cultural models are beginning to break

down. These include creator versus consumer, of course, but also high vs popular culture. Robbins also suggests that the quality and relative accessibility of new technology and distribution networks means that independent and experimental work is no longer condemned to obscurity. In fact he contends that we need to end the “tired theatre” of opposition between artists who cultivate exclusivity and look down on mainstream culture, and a mainstream industry that cultivates the illusion of speaking for the masses and encourages a suspicion of intellect and experimentation. [8] I would argue that many other traditional distinctions such as art vs design, object vs performance and virtual vs physical are also, at the very least increasingly unstable. Contemporary game culture participates in and provokes this fertile instability.

The visual part of this presentation will look at a few recent games that experiment in different ways with the game form. (Needless to say, in such short presentation it is difficult to suggest the variety and breadth that is currently emerging around games or to decide what angle to privilege). The four games I will present are: *Propinquity* (2010-11) a full body game by myself and Bart Simon, *B.U.T.T.ON* (2010) by Douglas Wilson of Die Gute Fabrik, *A Slow Year* (2010) by Ian Bogost and *Chain World* by Jason Rohrer (2010).

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1. *Bio “media” may dominate experimental culture relatively soon but this does change the fact that the game is replacing cinema-based culture.*
2. *Emergent qualities are unanticipated ones that arise due to the complexity of a system. Increasingly, emergence in games is seen as desirable.*
3. *See, Ian Bogost’s notion of procedural representation or Will Wright’s ideas about reverse engineering simulations.*
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THE TALL AND THE MOBILE: A MEDIA ARCHAEOLOGICAL INVESTIGATION OF THE MEDIATIZATION OF OUTDOOR SPACES

ERKKI HUHTAMO

This paper tries to understand the current modalities of outdoor media use by excavating the processes of their becoming and the various cultural forms that have anticipated them. The theoretical issue informing the paper is the formation of the "outdoor subject" - the observer, the listener, the interactor - of media culture.

Media scholars have traditionally focused on audiovisual forms that are experienced indoors and in static settings; cinema-going and television spectatorship provide good examples. Researchers are slowly beginning to realize that such an emphasis covers only a part of the complex terrain that constitutes media culture. That part may even be shrinking, thanks to current developments within urban environments and experiences. Not only are metropolitan cities covered by high-tech media attractions such as giant LED-display screens; a growing number of citizens are walking or cruising through such spaces with media devices in their hands. The current smart phone revolution may be just a beginning for much more dramatic technological, behavioral and cultural changes.

This paper will approach this situation from a media-archaeological perspective, trying to understand the current modalities of outdoor media use by excavating the processes of their becoming and the various cultural forms that have anticipated them. These earlier forms are not treated as clear genealogical steps leading to the present condition. Rather, they are analyzed as symptomatic manifestations of contradictory motives and discursive fragments that have at various times and contexts highlighted issues the current media culture may erroneously believe it is encountering for the first time. Such issues cover, for example, the saturation of the city space by commercial messages like billboards, and the attitudes toward them; the varied early forms of "mobile media" such as "walking human posters" (sandwichmen), and the practices of using fans, watches, and other forms of "proto-wearable" media; and the complex relationships that developed between them. Ultimately, the theoretical issue informing the paper is the formation of the "outdoor subject" - the observer, the listener, the interactor - of media culture. The process of its becoming is far from clear-cut, involving numerous detours, lacunas and pot holes of history, buried deep underneath the "officially" recognized and legitimized media cultural developments.

The evolution of outdoor advertising in the nineteenth century is an important topic to investigate, not only because of its proliferation and institutionalization, but also because of the enormous enlargement of the ads themselves. The earliest signboards and broadsides were relatively small. Their scale could be characterized as anthropomorphic, which more or less corresponded with the dimensions of the living environments. From the Middle Ages to the early modern times, the elements that did not conform to this principle had to do with power. Cathedrals, city walls, castles and town halls were meant to impress the 'common people' by their size. Gothic cathedrals had enormous rose windows made of thousands of pieces of stained glass. Standing under Bernini's immense cupola at the new St. Peter's in Rome was meant to convince the visitor of the might of the catholic church. Still, even extraordinary public sights, such as the astronomical clocks built into the walls of churches or townhalls (sometimes on the outside) often consisted of relatively small elements. Their clockwork-operated *Jaquemarts* performed at regular

intervals, but the mechanical moving figures weren't necessarily larger than the automata demonstrated at fairs by itinerant showmen.

An indication that the situation was likely to change was provided by an early nineteenth century French cartoon that shows two men trying to read announcements posted on the wall. [1] One of them is peeking at the densely filled sheets from a ladder, while the other is using a telescope. Although the point of the cartoon is the absurdity of posting long official notices on the wall, its 'statement' can be generalized. Broadside began not only piling up, but also climbing up along the wall, which made reading their messages difficult. Interestingly, broadsides were sometimes called 'handbills,' which refers to their other use: the practice of distributing them from hand to hand.

During the nineteenth century the situation changed dramatically, partly due to economic developments and changes in the urban environment, partly because of improvements in printing techniques. Toward the end of the century it had become possible to produce very large chromolithographic posters in multiple colors. Graphic designers learned to deal with large size, concentrating on elements that could raise interest, and be detected from a distance. They simplified the textual part of the message, focusing on the trademark and what came to be known as branding. Advertisers also began to take into consideration the placement of the billboard within the 'adscape,' playing with issues of scale and perspective. An 'aesthetics of the gigantic' was in the making.

The development led to the opposite direction as well: from enlargement to shrinking. Lithography and its improvement, chromolithography, as well as the techniques of photographic reproduction, provided possibilities for an unprecedented production of "smaller than usual" pictures. Illustrated magazines were part of the trend. Tiny mass-reproduced images spread to any imaginable place, even though the fashion among society ladies to dress up in photographs (a strange echo of the 'animated sandwiches' walking on the streets) proved to be short-lived. [2] Pictures filled up photographic albums and scrapbooks, and were also used as raw material for parlor pastimes, such as the creation of colorful collages of 'found' imagery on the common folding 'screens' (room dividers). So the enlargement of public images was accompanied by its reverse: miniaturization and privatization.

The mediatization of public space was reflected in the cultural imaginary. The dream worlds of emergent consumerism were internalized as shared (day)dreams. These were expressed in complex ways by cartoonists. A well known motive was the "bill poster's dream" that showed a bill poster sleeping next to a wooden fence completely covered by overlapping broadsides; their combinations led to the formation of surrealist-sounding sentences (anticipating the *Exquisite Corpse*). This idea was anticipated already in the 1830s in a series of prints titled "Cross Readings" (W. Jeffery, London), but without the dreamer (the composite messages were read column by column from top to bottom, in the manner of a newspaper page). The dreamer of consumerist dreams turned into a cultural topos that appeared in numerous versions, including political and propagandistic ones. In the time of the American Civil War, the Confederate President, Jefferson Davis, was put into the dreaming bill poster's place as the "rebel bill-poster" by *Harper's Weekly* (March 1862), seeing the war as nightmarish "writings on the wall."

The outstanding summary of this topos tradition was Busby Berkeley's "optical illusion" sequence for the Warner Bros musical *Dames* (dir. Ray Enright, 1934). Young lovers, who are traveling in a tram, fall asleep in their daydreams. At the moment of losing consciousness, the seductive posters on the walls of the tram are associated by the male's (Dick Powell) mind with his girlfriend's face. This provides the entry point to an outlandish dream sequence, where scores of girls carrying advertising boards (with the girl's iconic face, doubling as the character and the star actor, Ruby Keeler) are transformed into a series

of elaborate fantasies following one another. The spectators are transported deeper and deeper into the logic of the capitalist dream worlds. The external is merged with the internal. The concrete manifestations of commercial media culture are situated in the lead mail character's, and as a consequence, into the spectator's head. The musical film (ironically and significantly, produced in the heart of the Great Depression) provides the device that weaves the outside and the inside together.

To understand the peculiar ways in which the large and the small, the external and the internal were merged together, one might use the idea of the "gulliverisation" of the visual environment, as I suggested twenty years ago. [3] The concept refers to a two-directional optical-cultural 'mechanism' that worked against the idea of a common anthropomorphic scale. The size of the human observer kept on shifting between gigantic (in relation to the *carte-de-visite* photographs or tradecards) and lilliputhian (in front of large billboards or below advertising spectacles in the sky). Something similar happened in the field of media: 'immersion' into an enormous circular panorama or diorama painting (and later, the cinema screen) found its counterpart in the act of peeking at three-dimensional photographs with the ubiquitous hand-held stereoscope.

Gulliverisation operated at the divide between the public and the private. The dimensions of the urban environment, with the skyscraper as its ultimate manifestation, became more and more 'inhuman' – as the cultural reformists readily pointed out – whereas the home provided a welcome return to the anthropomorphic scale. The countless miniature objects and images that dotted the Victorian parlor were a way of handing the inhabitant an illusion of control that s/he was more and more clearly losing in public outdoor spaces. The gulliverisation also raised the issue of the relationship between things that are near (tangible) and distant (unreachable). Mediating between these opposites became a part of the advertisers' strategies, even if it may not have been always explicitly formulated. The billboards gave products a monumental and 'universal' quality, associating them with the urban environment. Tradecards, newspaper ads and other tangible forms brought them close, making them tangible and 'personal.' At the fingertips such paraphernalia functioned as temporary placebos for the products the subject did not (yet) possess. Everything was mediated by 'magic' transformations – in particular, by changes of scale that were inseparable from the perceptions and motions of the observer (the potential buyer).

Similar 'bipolar optics' manifested themselves somewhat later in phenomena like the movie stardom and the ideological manipulation of the masses in totalitarian societies like the Nazi Germany. From around 1920 pictures of film stars became one of the most popular topics for *figurines*, collectable trade cards. The uncannily large faces that stared at the observer from promotional billboards and the cinema screens were shrunk to the size of one's fingertips: the object of adoration from afar suddenly was close and tangible. These pictures had an assignment in the expectations, promises and lust-evoking machinery with which the star cult was maintained. But they could be, if kept just like family pictures in the wallet, more than just a picture: the representation of someone who wasn't there, almost a part of that someone, a way of touching the thing that avoided being touched. The religious qualities that are often associated with the star cult may be the most apparent in the star figurines. In fact, they resemble mass-produced devotional cards, whose iconography derives from altar paintings and other large-scale religious representations. Advertising, the star system and the religious worship share the interplay between the monumental and the intimate. In this sense commercial billboards could perhaps be characterized as altar pictures for the cult of capitalism.

The Nazis were aware about the ideological possibilities inherent in the gulliverisation of the visual sphere. They harnessed new media, such as cinema, radio, and even television (still at an experimental

stage) for their purposes. They organized carefully 'orchestrated' mass events and symbolic acts, including 'spontaneous' book burnings, and the dramatically staged *inferno* of the Reichstag (for which they accused the Jews). Leni Riefenstahl's state-sponsored 'documentaries' *Triumph of the Will* (1934) and *Olympia I-II* (1938) were part of the media façade the nazis built to impress both the Germans and the foreigners. Massive billboard-like images of Hitler's face were displayed in the nazi rallies (reminding one of the strategies used by other totalitarian regimes), but the nazis also understood the power of the ephemeral. The ideological indoctrination of a nation depended not just on explicit propaganda and mass rituals relayed by the media, but also on seemingly insignificant channels. A company named *Cigaretten-Bilderdienst* was established by Joseph Goebbels' Propaganda Ministry to produce series of collectable cards placed in cigarette packs. [4] Their subjects included the life of Hitler, nazi uniforms, the *Anschluss* of Austria and the *Wehrmacht*. Predictably, there was also a series about the Berlin Olympic Games of 1936, which provided the lilliputhian counterpoint of Riefenstahl's colossal film. Handsome collectors' albums, with carefully scripted captions, were also produced; the nazi ideology was internalized as a 'side-product' of 'innocent' hobbyism.

Adding the fascination of the media apparatus to the collecting experience, the Munich-based Raumbild-Verlag published sets of 3-D picture-pairs of Germany's war efforts. [5] These were viewed with a stereoscope that was stored, together with the stereocards, within the album. The first volume depicted the Polish campaign of 1939. This evokes an important issue that cannot be elaborated on here: the proliferation of portable gadgets. [6] It may not have been very evident at first. In the late nineteenth century the amateur photographic camera was one of the few options. Portable radios, sometimes in the guise of everyday objects, like purses or even pinkie rings, were introduced already in the 1920s, decades before the breakthrough of the transistor radio. Eventually, mass-marketed gadgets like Sony's Walkman, Apple's iPod and the nearly endless variety of pocket-size mobile communication devices would change the users' relationships to their surroundings, including the public screens. In a few experimental cases (mostly in the media arts) the personal portable devices have been turned into terminals for manipulating the content of public screens. Understandably, this has been limited by the authorities, who want the ultimate control over the public space. Handheld mobile screen-based devices may be a challenge to the giant screens, but this challenge is perceptual, rather than interactive. It has to do with the quality of looking, its direction, mobility and intensity. These issues began with the gulliverisation of the visual culture in the nineteenth century.

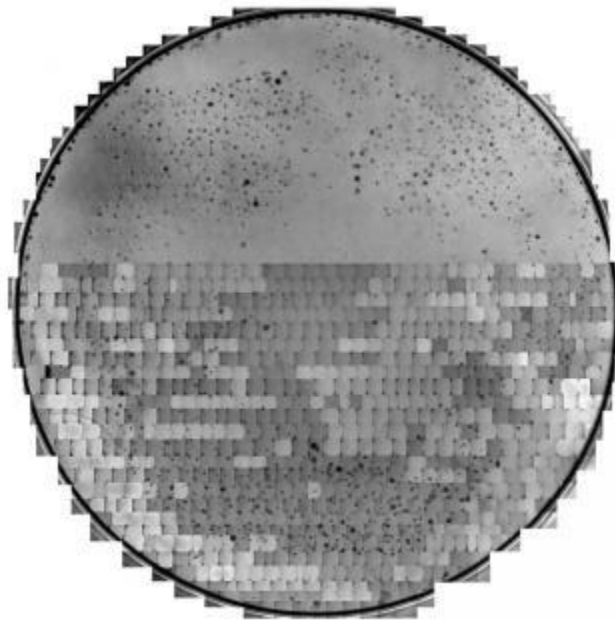
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PERIPATETIC VISUALIZATIONS: WANDERING BETWEEN ART AND SCIENCE

Christina Nguyen Hung

Through this work, I create situations in which viewers are required to negotiate space and engage in kinetic activity – to move their bodies in order to experience the “scientific” visual material on display. In this situation, no single perspective is privileged as ideal. It is designed to prevent a disembodied, cinematic mode of viewing and all the privilege, knowledge and power that such a mode of viewing implies.



*Neurons In Vitro, 2010, Christina Nguyen Hung, high-resolution image of chick embryo neurons in vitro
144 × 144 in.; 365.76 × 365.76 cm.*

In my most recent work with high-resolution images, I use microscopy equipment and techniques to visualize a wide variety of biological and geological materials. This work began with the assistance of a former graduate student of Clemson’s Bioengineering program. With his assistance I attempted to control the growth pattern of chick embryo neurons in vitro. While our efforts to produce a specific pattern (of text) were not successful, the failure of our experiment yielded results that were in fact more interesting to us than what we had set out to create. The neurons formed groups roughly equal in size and the groups were spaced evenly across the petri dish. The student confessed that he had never seen anything like it and I found the results to be visually, quite compelling. Unfortunately, due to disciplinary and research constraints, the student did not have the freedom to investigate our results further. For the student scientist, the work ended there. I on the other hand, photographed the sample – the entire 35mm petri dish -- at 10x magnification, a process that yielded over two thousand images.

Since I photographed the neuron culture at the end of 2009, I've been analyzing and aligning the individual images in an effort to create a single image that, when completed, will allow us to see both the individual cells and the entire in vitro environment, simultaneously. This produces a second interesting research problem: the visual (image) I am attempting to create far exceeds the capacity of any large format printing system and pushes the limits of new high-resolution digital display system. When complete, the printed neuron image will measure at least twelve by twelve feet.

Through this work, I intend to create situations in which viewers are required to negotiate space and engage in kinetic activity – to move their bodies in order to experience the “scientific” visual material on display. In such a situation, no single perspective is privileged as ideal. One cannot claim with any certainty that one has fully experienced the image and therefore cannot claim full knowledge of the object represented, without also having to acknowledge that their relationship to the visual material is contingent, deeply subjective, limited by their location in time and space and the physical limitations of one's own body. This situation is profoundly different from the way we are permitted to access large amounts of visual scientific data through software interfaces such as Google Earth, Gigapan and other screen-based interactive game/display spaces. Through such software interfaces, the viewer participates in a disembodied, cinematic mode of viewing and all the privilege that such a view implies, in terms of knowledge and power, remains unquestioned.

In the future, the large quantities of video and photographic material I gather will provide the foundation for interactive, semi-immersive art installations. Through these installations, I will be able to extend the conceptual basis for my current work by modeling extreme differences of vision. For instance, such work might permit us to imagine the world as it might be seen through a compound eye structure, much like that of the common housefly. The premise for this work being that it is entirely conceivable that such a visual experience might further reveal how our understanding of the material world and our relations to it have been entirely governed by the very anatomy, the limitations of our human, binocular visual system. It is my hope that these installations (images and immersive experiences) will allow us to rethink our relation to the world around us in radically new ways.

For example, in “Mapping the Empire v.1,” four HD video cameras are strapped to my wrists and ankles as I traverse a rock formation. A “map” of the terrain emerges from the process that suggests a mode of perception that is distributed, and polyvalent. This approach represents an inversion of the landscape tradition, which reproduces the perspective of a single human and uses the window as an organizing compositional metaphor. Taking my cues from GPS, and social networking technologies I employ an approach to visualization that is ecological, collective, and distributed: data is gathered, processed and then [de/re]composed. In Empire, the “map” I create nonsensical, more accurate as a record of motion defined by the logic of living flesh, rather than a systematic grid-like construction of space and time.

This claim: that a new, technology aided system of vision might allow us to experience the world in new ways by generating models of extreme difference, is not a new one. Many of us who work with new visualization technology hope that our work will inspire others, especially those within the scientific community, to be more open to “difference” or at least, to pause and consider other possible interpretations and meanings presented by the visualizations we all create. What is interesting to me about this claim is that few researchers seem willing to contemplate and articulate the assumptions about difference per se that are implied in such a claim, and even fewer are willing to explore the impact that their work might have on our cultural understandings of difference. What is implied in the claim is that we, as makers of new visualizations hope our work will inspire tolerance of difference and that representations

of extreme difference will affect our cultures, leading them to embrace diversity in material, thought, cultural and bodily forms. Obviously, I myself harbor this hope.

In part, what I hope to achieve through this work is, in a limited sense, an intervention of sorts. By using new visualizations technologies and processes, I create images and experiences that are not only different but that prompt questions about the practice of visualization in contemporary science and knowledge generated by these practices. In works like “Shattered,” “Crushed” and “Burned,” there is no attempt to ascribe a scientific value to the image. Historical, literary and cultural narratives are impossible to avoid when one looks at these images as they are constructed so that historical and cultural contexts are foregrounded, along with obvious references to imaging in science and technology. Through these images, researchers in science and technology are asked to respond to the social context in which they work in a new way, just as scholars in the arts and humanities must respond to new models of thought and creativity posed by developments in new technology.

WITH DESIGN IN MIND? 'MORAL ECONOMY' AND CONTEMPORARY DIGITAL CULTURE

Gordon Hush

Technological innovation is often characterised as producing a moral economy of “tempted” bodies, corrupted desires or utopian potential distorted by unlimited possibility, and juxtaposed to a now-foregone simpler era and existence. This paper seeks to explore the relation between subjective experience (consciousness) and the contemporary environment, in particular, the dissemination of digital technology within mobile devices.

This paper addresses the anxieties around ‘freedom’ in relation to emerging technologies and their use in contemporary capitalist culture. It does so by investigating the figure of ‘the consumer’ and its mediation of the relationship between the human, the artefactual, and the proliferation of digital devices and services. The failure of the discourse of consumerism to explain today’s culture reveals an *aporia* regarding the description of the mutually constitutive relationship between people and things. The historic attempt to ground theories of the human in rationality, desire and now the brain/genes reveals a fear of freedom, of the loss of demarcated boundaries, of definitive distinctions between moral and immoral categorisations of activities and pursuits. The technological capacity of contemporary capitalist culture, its devices, distractions, pleasures and potential represent a problem for the social sciences and their conceptualisation and explanation of the behaviour of human beings, as citizens, as consumers, as gendered identities, as workers etc, precisely because the non-human world is changing so dramatically.

Broadly speaking, social sciences assigned people identities, roles or types, which might vary or overlap with context but which were largely stable and enduring – even if less stable or enduring than those putatively assigned to earlier social formations or other cultures. This implied shared moral framework translated into ethical action, understood as personal conduct shaped to a greater or lesser extent by law and custom, as the citizen-consumer exercised choice as an indicator of personal (psychological) preference based upon calculations of utility framed within a set of circumstances including individual idiosyncrasy, socio-economic position and educational background. This position evolved over two centuries against a backdrop of the production of capitalist commodities, desirable objects and mechanical machinery – alienable and demarcated in time and space. The historically recent plethora of digital devices and immaterial services has complicated the relationship between people and things, consumers and commodities, to such an extent that previously held shibboleths describing consumption require revision. Arguably, the digital domain has altered the spatial and temporal rhythm of contemporary life to the point where neither ‘consumption’ nor ‘production’ remain unchanged and the modality of the inter-relation between the human and the non-human must be reconsidered.

The relation between human and non-human coalesces around technology. The anxiety over this liminal threshold has prompted an inquiry into whether some property of human physiology, perhaps the brain or the genes, can offer a foundation for this discussion; or whether a useful contemporary understanding of ‘human’ requires the radical re-thinking of our relationship to the non-human. Against the nostalgic evocation of an ‘authenticity’ accorded to certain desires or actions in which the human can be rooted this paper asserts the latter. Rather than devise a moral economy of action, exemplified in consumer activity, to define the limits of the human through notions of taboo, sin or the profane – without

denying the legal framework that codifies such concepts – this paper considers the concept of human as part of an evolving discourse emerging from contemporary culture and its formulation of a relationship of ‘co-shaping’ between people and things.

The historical evolution of the figure of the consumer and its centrality to contemporary accounts of life in capitalist culture is predicated upon the role of choice; where selection signals preference based around a calculation of value amongst equivalents or alternatives. This unification of bourgeois psychology with utilitarian economics sees a socialised *homo oeconomicus* as a self-directed individual acting in concert with personal desires and social norms. Consequently, the discriminating choices and purchases evidenced by goods and services assert an apparent unity of psychology and social life. This is the normal and normative individual engaged in the ‘biographical fiction of the self’ [1] through an interaction with the material culture of contemporary capitalism.

This fiction of the consumer is at odds with the historical evidence – most obviously when the pathological acquisition of objects, services or experiences are considered. The ubiquity of eccentrics, collectors, hobbyists, the predominance of habits, acquired, inherited or imitated behaviours, the over-indulgent or self-denying obsessive all serve to dispel such a myth. Indeed, the only possible existence for such an ideal-type consumer or citizen would as an absence, as a putative precondition that was ceaselessly interrupted and deviated from.

The nineteenth century’s expression of the utilitarian psychology through rational action as the precondition of identity production appears superannuated:

The classical bourgeois world view can be understood as a process of individuation, as the pursuit of pleasure. The pursuit of pleasure is the pursuit of the self; and the self, like the cosmos, is a system of relations tending towards a unique equilibrium. This has long since ceased to be a plausible view of either psyche or cosmos. [2]

As a result, *homo oeconomicus*, the homunculus of the ‘consumer,’ was rendered redundant just as the figure of the consumer was adopted by discourses as varied as law, political theory, marketing and sociology as the basis of an explanation of the particularly modern incarnation of ‘consumption. Here freedom to consume is the freedom to construct an idealised version of the self, to express through external actions the inner being. Consequently, the types of choices made, the preferences expressed are freighted with meaning and significance implying, as they do, the inner world of psychology, morality and personality. In this way the problem of choice, of particular choices or even the renunciation of consumerism are deemed to be moral considerations, ethical activities and problematically gendered experiences. Against, ‘economic man’ and his will expressed through the manipulation of the material world in accordance with a rationally organised desire for utility stands a hysterical figure that is prey to the irrational emotions and temptations of desirable commodities.

While social science added psychological and socio-spatial meat to the bones of *homo oeconomicus*, the ‘consumer’ remained the moral intersection of bourgeois psychology and utilitarian thought. The subject was considered an active agent who organised the world of inert matter or manipulated pixels on a screen, in the service of a desiring self. Critical sociology sees in this the realisation of an authentic selfhood stymied by the denigration of experience inherent in the ‘culture industry’ and an ‘ersatz individuality’ [3] as the result of a corrupted libidinal economy. The manipulation of commodities to manufac-

ture personal identity can involve a degree of 'risk' for the subject, as unstable identity formations, contingent upon consumption habits and practices, solidify into lifestyles, which are viewed as being to whatever degree deviant, immoral, or illegitimate.

This desiring consumer can be seen as the lodestone of a nascent 'consumerism' and 'consumer society,' a harbinger of modernity and the 'mass' consumer society of today. In doing so, alternative forms of exchange – non-modern, non-market forms, such as gift-giving – became the focus of a nostalgic privileging of the archaic that functioned as a fantasy of the 'real' or 'authentic' in human consumption that is apparently warped by the over-provision of commodity capitalism. Here the promised satisfactions of the commodity outweigh utility, and possession comes to be predicated upon meaning, or social worth, rather than functionality.

As a brief example it is instructive to consider the recent riots in the United Kingdom's larger cities. In an economic era commonly termed 'post-scarcity' – in which mass consumption prevails for the majority of the populace – even allowing for these recessionary times, much of the mass media coverage of rioting focused specifically upon *looting*, and the illegal removal of goods from retail environments (or other looters). People who were otherwise, and previously, considered to be consumers were denounced as *feral*, *criminal*, or *manic* and their actions immoral, sinful or unreasonable. Such unruly consumption does not bear upon the *use* to which any goods appropriated would be put, but simply describes the manner of their acquisition. It is interesting to consider that the goods liberated from stores – at least as reported in the popular media – were consumer items (widescreen TVs, mobile phones, designer clothing: portable, high-value items), which simply replicated the types of goods already possessed by many of those rioting or looting. Indeed, the difference between looting and shopping appeared to be the unregulated manner in which it occurred – the absence of law, social convention, surveillance and the disciplinary apparatuses normally associated with these. So, the rationale governing the actions of individuals was not simply a desire for utility, economic necessity or, in most cases, pre-planned criminality. It is precisely in the *irrational* aspect of these events, in their *group* character that we see the failure of conventional models of the consumer.

By characterising the riots and looting as *immoral* and unreasonable acts the political and media apparatuses seek to re-assert the fiction of the morally responsible, rational and law-abiding citizen-consumer at the heart of contemporary capitalist society. Even when criminality intrudes and individuals are suborned in some manner this must be construed as a *deviation* from the norm that creates transgression. Beyond assertions of "mob rule" there was no attempt to understand the behaviour of the participants in these events as members of a group in which the group is the unitary entity, and that its behaviour and rules of operation and engagement would not conform to those normatively expected of individual consumers. The concept of mob rule was deployed to explain why an aggregation of individuals behaved in such unexpected fashion.

However, a contradiction emerges between the rational and irrational, moral and immoral since the apparent co-ordination of mob or looter activity, was deemed to be rational, planned and criminal. And the tools that allowed this to occur? Digital devices. RiM's Blackberry 'phones and its messaging service were pinpointed, one politician to urging a 'BBM curfew' in London. However, the hysteria highlighted here by those unaware and fearful of the technological possibilities of digital devices (and the many alternatives to BBM) exposes a fear of emerging technology that echoes the alarm over commodity fetishism by critical sociology – that otherwise rational, discerning, morally upright individuals will be seduced into inappropriate activities by *objects*, either alluring commodities or technologies that confer a seditious set of freedoms upon their users.

Into the 'black box' of the technological device disappears the rule of law and the citizen-consumer; by simply assenting to the potential of such technologies, so this logic goes, we are losing, undermining or deforming our humanity – a physiological as well as moral corruption occurs because our bodies and our minds are embroiled. The possibility of the corruption the flesh and the mind of the users of such technology through the stimulation of illicit or novel desires re-animates religious conceptions of sin and taboo in the contemporary world, even underpinning notionally secular discussions. The degree of freedom putatively offered by digital technology, whether in the web itself, the communications and interactions it makes possible or the purchase of goods and services it facilitates, seems to escape regulatory purview – where are the digital police, and what might they term a crime? In the absence of the citizen-consumer and a pseudo-rational pursuit of utility, how are we to determine the nature and conception of the human agent and identify appropriate limits upon action? How is it possible to determine the *authentic* human desire or action from its inauthentic counterpart, which arises merely from tempted flesh and seduced mind, born of an excess of possibility?

One position can be phrased as: if we distinguish truth from falsity, the authentic from inauthentic, based upon a combination of physiology and psychology then we can legislate accordingly. The enduring appeal of medical discourses in the arena of consumption is evidence of this: including 'hysterical' women being pathologised as kleptomaniacs or phrenology revealing thieves. Descartes' mind/body dualism here hints at resolution, if only we know where to look. This putative re-unification of the biological and the symbolic, of matter with meaning, whether removing the false freedoms of technology or the fetishistic deception of the commodity-form, would allow for authentic experience of the world, discrimination between the true and the false, the consecrated and taboo in a contemporary and technologically permeated world. A 'moral economy' of action might emerge that would reconcile the human with the non-human by asserting what it was permissible to ask of the world and those within it. No longer would desire (cause) result in an immoral or inauthentic longing or wish (effect).

This is precisely the promise of explanations premised upon the relationship between the social and the natural or medical sciences. For instance, the emerging area of neuro-anthropology seems to promise just such a reconciliation via its address to the 'encultured brain' and investigation of the relation between physiology and culture. Equally, developmental psychology or behavioural economics seek to patrol and map such terrain in their own distinct fashions. A more intriguing starting point for considering the relationship between technological culture and human behaviour might be Marshal McLuhan's famous dictum that media, artefactual as well as communicational, are 'extensions' of humanity. Such formulations foreground the relationship between humans and non-humans, highlight experience and invite a discussion of consciousness under specific conditions, rather than as a human attribute absent in non-humans. In proposing a relational understanding of consciousness, rather than its 'medicalisation,' we avoid a reduction to the brain as site and origin of consciousness (intention).

Explaining human action in this manner requires unpicking the enigma of the mind/brain (consciousness) by resorting to technologies capable of imaging or 'imagining' the brain's operation. In imaging the brain in search of consciousness and the source of human action, science must attribute to it changes of state that are visible and recognisable, to which are assigned functions, states and operations: to these, in turn, is attributed a relationship to consciousness and action. In relation to Persistent Vegetative State (PVS), we expect or require patients to respond to stimuli – questions, medical probes etc – in the manner of the healthy. Failure to respond as expected and they are deemed to be functioning imperfectly or not at all. However, they may simply be functioning – interacting with their environment and us – in a markedly different or altered fashion, which we are failing to recognise, comprehend and respond to in our turn.

The various medical technologies for inspecting and interrogating the brain as it operates include Positron Emission Tomography (PET) and functional Magnetic Resonance Imaging (fMRI), both offer indications of levels of cortical activity in patients, but establishing how these quantitative measures relate to qualitative experiences or states of mind, or even capacity for such things, is problematic. The multi-coloured images produced are intended to correspond to levels of varying neural activity. However, the description of such fluctuating processes in no way supplies an explanation of their role in or relation to conscious experience or intentional action. Emerging digital technologies appear to complicate the question of what it is to be human, and identify a specific anxiety on this point with regard to contemporary culture. The reconciliation of biology with the symbolic, physiology and culture, in a comprehensible relation of cause-and-effect is both promised by technologies, such as PET or fMRI, and undermined through the generation of innovations in how humans and non-humans interact, the expansion of possibilities for experience and affective transformation.

It may be instructive to pursue the relationship between humans and non-humans, the association or networking of actants (Latour) or the relation between organisms and their environments discussed by ecological psychology, which 'affords' experiential possibilities for individuals and populations. This allows a 'postphenomenological' (Verbeek) [4] analysis of the relationship between people and things in which the Cartesian privileging of the human subject is circumvented through an analysis of the 'ontological relationship' of affordance forged between 'organism and environment.' [5] Specifically, this asserts the mutually constitutive relationship between people and things:

... the concept of mediation helps to show that technologies actively shape the character of human-world relations. Human contact with reality is always mediated, and technologies offer one possible form of mediation. [However...] any particular mediation can arise only within specific contexts of use and interpretation. Technologies do not control processes of mediation all by themselves, for the forms of mediation are always context-dependent [...]. [6]

The immersive engagement with technology obliges the human body to become the repository for the forms of experience that arise: the aesthetic and sensorial experience generated in the relation of affordance acts to transform cognitive capacity, as anyone who has ever looked through a microscope or a telescope can testify. Latour's re-discovery of Tarde's rejection of a 'primordial identity' in favour of a constant process of differentiation of 'being' through 'avidity,' or having, implies that every actant is an 'unstable aggregate' defined by the qualities it possesses.

Subjectivity, corporeality is no more a property of humans, of individuals, of intentional subjects, than being an outside reality is a property of nature [...]. Subjectivity seems also to be a circulating capacity, something that is partially gained or lost by hooking up to certain bodies of practice. [7]

Consequently, the continuous transformation of subjectivity through the experience of difference is exacerbated by participation in the technological arena. The relationship between people and things functions as a medium within which being is articulated to having as an 'affordance' that re-defines subjective experience: this transmission of experience allows the 'differentiation' of the individual from itself in space and time. So, possession is not purchase, acquisition or ownership but the re-formulation of the relationship between 'being' and 'having' in which concepts of morality are dispersed by technology. In place of desiring consumers, 'unstable aggregates' constituted by their historical experiences and technological relations of affordance coalesce. The plenitude offered by digital devices and the service-based interactions they support 'affords' a range of experiences appear 'immoral' and corrupted only when

viewed through the lens of the nineteenth century and its economy of desire subordinated to rationality.

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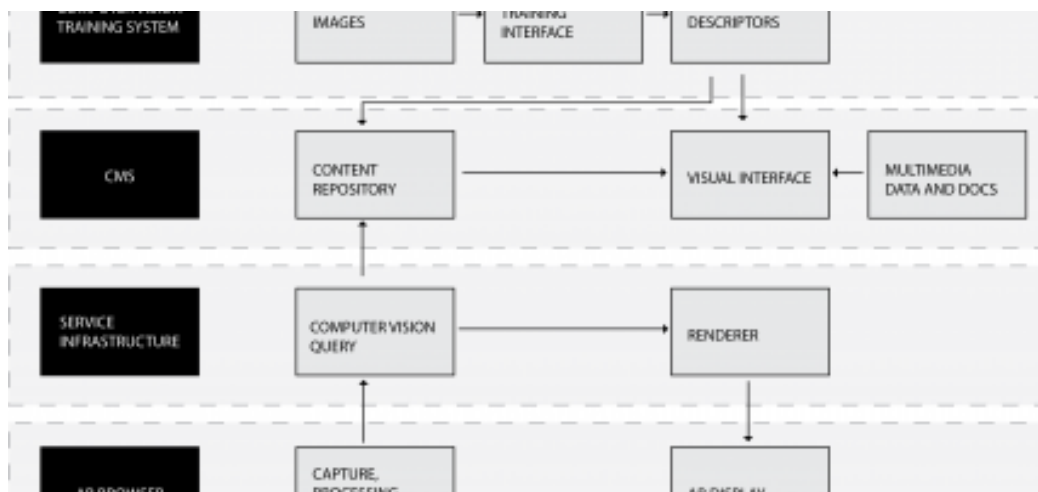
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LEAF++

Salvatore Iaconesi & Luca Simeone

Leaf++ is the product of a research project that aims at designing a prototypal interactive system involving computer vision, gestural interfaces, augmented reality technologies and cross medial platforms to create a novel tool to experience botanical information about plants and their leaves.

A computer vision system in a mobile application is able to recognize the leaf and to show available information.



Leaf++ logical architecture (courtesy of the authors)

Introduction

“The Third Landscape – an undecided fragment of the Planetary Garden – indicates the sum of the spaces in which man gave up to nature in the evolution of the landscape. It regards urban and rural forgotten places, spaces for transit, industrial wastelands, swamps, moors, bogs, but also the sides of roads, rivers and train tracks. The whole of these forgotten places are reserves. De facto reserves are: unaccessible places, mountain tops, uncultivated places, deserts; Institutional reserves are: national parks, regional parks, «natural reserves».” [1]

Gilles Clément's Planetary Garden is one of the most suggestive answers to the mutation of the definition of urban space. Planetary Garden is to economic and urban globalization what urban gardens were to the cities of the 19th Century.

The Third Landscape is a connective fabric composed of residual spaces that tend to take a liquid state, never preserving shape, resisting governance. Classical preservation or environmental conservation

tools such as surveillance, protection and the creation of limits and borders cannot apply to the Third Landscape without destroying its characteristics, as Clément writes [2] “not property, but space for the future”. An idea of space that goes beyond the ideas of landscape as a place for identity, being used as an asset for local societies, and as a strategic tool for memory.

As John Barrell spoke about “the dark side of the landscape” [3] while pointing out the imposition of a point of view of a single social class, with Clément we could speak about a “light side”, for the Third Landscape is not an exclusive model but an inclusive one: “a shared fragment of a collective consciousness”. It is based on a planetary remix (brassage) which is at the origin of the current richness of ecosystems. [4] Clément talks about the necessity of training our gaze into recognizing and understanding the Third Landscape. This requires a new possibility for vision and knowledge dissemination in urban natural environments, a renewed sense of aesthetics, and a morphed sensibility for the possibilities for interaction and communication offered by our surroundings.

Our current interaction and interrelation with the natural environment in urban spaces is mainly delegated to an institutional definition of borders and is rather far from the traditional knowledge of the ecosystem and its elements. Globalization and daily routines often force human beings to recognize plants and vegetables only in terms of their use in products that are found in supermarkets, or of the trees and bushes that decorate the sides of our roads. People progressively lose contact with the knowledge about the seasonality and origins of vegetables as they have come to expect any given product at any given time in a supermarket. One study, [5] among many other studies of a similar scope, gave advice to farmers in remote parts of the world encouraging the production of off-season products for export and highlighted this practice as a truly effective marketing strategy based on the documented assumption that consumers want specific products all-year-round.

Stepping outside of the supermarkets, we see that plants still remain within the great unknown as regards the majority of inhabitants of urban spaces. In cities, plants populate the periphery of our world view, living a life that is mostly aesthetic and excluding practically all forms of knowledge about their origins, characteristics, benefits and roles in the ecosystem, which remain largely hidden from the majority of citizens.

Leaf++

Leaf++ is an ubiquitous, interstitial information tool.

It is designed as a new “eye” that can be used to look at the natural landscape of our cities.

It is designed to help us see and understand the Third Landscape.

Leaf++ is an augmented reality system which employs computer vision techniques to recognize plants from their leaves, and allows us to associate them with digital information, interactive experiences, and generative aesthetics whose purpose is to create a disseminated, ubiquitous, accessible form of interaction with the natural environment, realizing a suggestive, exciting, desirable and accessible contact with the knowledge, wisdom and awareness about the inhabitants of the natural ecosystem in our surroundings.

Leaf++ shifts our focus in the vision of urban landscapes.

It is a tool for a new vision which, through augmented reality, enables the creation of an additional layer on our visual landscape: an infoscape and information landscape which is directly and coherently added to our vision; a new field of vision that is accessible by looking at the world through a mobile device which acts as a new lens on reality; a new vision in which leaves and plants come to a new visual life as the computer vision system actively searches for them and highlights them, populating our view with information about their origins, living conditions, characteristics and interactions with our urban/natural ecosystems.

Leaf++ acts as a distributed, dynamic, real-time, emergent geographer of the Third Landscape: each vision of a member of the plant kingdom in an urban space triggers a mutation of the map which is shared in realtime by all persons using Leaf++, providing a fluid cartography of the Third Landscape. These new visions are turned into an ubiquitous sensorial experience, transformed into morphing, moving images and sounds which create a state of wonder that further connects us to this new visual landscape.

Methodology

The Leaf++ project has been designed and implemented through the following methodological steps:

- initial briefing, which produced the definition of the concept;
- the choice and experimentation of several technologies which could be used to realize the concept;
- the design and implementation of several prototypes, which were used in an iterative, participatory process;
- the generalization of the best prototypal solutions into an open platform;
- the usage of the resulting platform to create two use cases, for education and artistic performance.

Leaf++ was intended as an augmentation for vision, to increase the level of awareness about the natural environment, to promote the establishment of a collaborative set of practices for dissemination, sharing and communication of knowledge and information about the ecosystem, and to create an ubiquitous digital interactive layer onto the natural environment that could be used for education, expression and for artistic and performative purposes. Anthropology, Cognitive sciences, Biosemiotics, Environmental Psychology and Aesthetics, together with a wide range of disciplinary experiences in geography, geobotany, ecology, landscape architecture and planning, converge in the direction of landscape ecology, and find landscape as a common meeting place. Several definitions of landscape emerge from all these approaches, as reported in Farina: [6]

- “the total character of a region” (von Humboldt);
- “landscapes will deal with their totality as physical, ecological and geographical entities, integrating all natural and human ('caused') patterns and processes ...” (Naveh);
- “landscape as a heterogeneous land is composed of a cluster of interacting ecosystems that is repeated in similar form throughout” (Forman and Godron);
- “a particular configuration of topography, vegetation cover, land use and settlement pattern which delimits some coherence of natural and cultural processes and activities” (Green)
- “a piece of land which we perceive comprehensively around us, without looking closely at single components, and which looks familiar to us” (Haber).

All of these definitions move across several dimensions in which landscape can be described, with the more cognitive-oriented ones (such as Haber's) resulting in broader visions that are able to bypass the

concepts that might classically be viable for public administrations to enact their policies and strategies, and to produce a more fertile humus for creation of a significative description of the planet which is able to include expressive and performative possibilities for humanity.

The concept of cognitive landscape, and of its possible contaminations through technologies and the results of the more advanced contemporary research in urban anthropology, has been a fertile domain for discussion during the initial phases in which we gave shape to the concept. A cognitive landscape can be thought of as the result of the mental elaboration by every organism of the perceived surroundings. [7]

We decided to contaminate the observations found in Farina's analysis of the theory of cognitive landscapes and of the mosaic theory within Clément's idea of nomadic observation of a constantly mutating environment, by focusing on the value of being able to recognize and understand the fluid and ever-changing natural ecosystem in a process that is inclusive, collaborative and disseminated.

In this mindset, we described a series of objectives, which later formed the concept for Leaf++:

- to create a tool for vision or, even more desirably, a new or mediated vision;
- to create an accessible and natural interaction metaphor, as close as possible to the practices to those which we are accustomed to; one which is easily executable by a wide range of persons across cultures, age groups, skills;
- to create an open platform so that it will, in and of itself, create an active ecosystem of practitioners wishing to use and modify it to enable more practices and possibilities for vision, awareness, understanding, expression and ubiquitous knowledge sharing;
- to create a usable information and interaction layer that is easily hooked onto the elements of the natural environment and that is accessible through mobile devices;
- to create a process which harmoniously conforms with the processes of our vision; just as we interpret what we see geometrically, symbolically, culturally or through our memories, experiences and relationships, Leaf++ should progressively populate our mediated field of vision with aesthetics, information, knowledge, possibilities for relation, understanding and interaction, just as details progressively emerge while we look at things;
- to create an aesthetic, sensorially stimulating, cognitively suggestive experience; one which is able to trigger wonder and emotion, to inspire action and participation, to activate cultures and open dialogues.

Along the lines defined by these objectives the research group set forth in designing the experience which was to be then implemented. The most pressing point turned out to be one regarding the ability to characterize Leaf++ as a "vision." Current Augmented Reality (AR) systems did not completely satisfy us with their interaction metaphors and in the composition of their interfaces as most of them heavily relied on movie-generated ideas of what an augmented reality interface should look like: radars, sonars, floating icons and other visual assets seemed to create videogame-like experiences that, while being usable and (in some cases) wonderful to look at, did not match the feel and aesthetics of the "new vision" which we wanted to produce. Our desire was to create a lens, a see-through transparency onto which the additional information layer would visualize in the most natural possible way.

Another pressing characteristic to be researched was the bypassing of the limits imposed by GPS driven augmented reality systems and to create an experience that was strongly based on (computer) vision.

One of the objectives which we regarded as being not only strategic but also fundamental in promoting the vision which is defined by the Leaf++ project was the requirement for openness of the technologies used and produced in the process. Due to this consideration the research team opted not to use any of the existing commercial (even if free) platforms that are currently available to perform computer vision based AR. We chose to develop our own technology and to release it for open usage to the international scientific and artistic community (the source code of all software used in Leaf++ is currently available on the project's website under a GPL3 license). The production of an open, working platform is, in fact, one of the most outstanding results of the project, and it fully supports the idea of open, accessible knowledge which we tried to enact in the natural ecosystem by engaging the making of Leaf++.

During the second phase of the project, the technological architecture was defined.

We chose to develop a mobile AR browser with the characteristics defined during the previous stage. The chosen mobile platform was developed for Apple's iPhone, mostly due to the availability of a stable development environment and for its ease of use – to satisfy the requirements in terms of accessibility and usability – and due to the availability of multiple international development groups dealing with computer vision issues such as the ones involved in the project, thus allowing us to establish an effective mutual collaboration which proved to be both effective and rewarding.

The platform which was created for Leaf++ is composed by the following elements:

- a trainable computer vision module
- a multimedia CMS (Content Management System)
- a service infrastructure

A computer vision (CV) module is used to provide image recognition features to the system. The CV module uses SURF (Speeded Up Robust Features) algorithms and techniques to identify the various types of leaves. The SURF image detection techniques and descriptors described in Herbert Bay, et al. [8] are used in the system together with a customized version of the optimizations described in Maha El Choubassi and Yi Wu. [9]

Specifically, the CV component is integrated in a system enacting the following process:

- image acquisition
- generation of feature descriptors
- classification and initial configuration of the CMS

A guided procedure allows the user to capture all the images that are required to correctly identify the relevant visual features of the leaves that are to be added to the system. In the next phase of the process an interface is used to navigate the groups of images of each feature and to use them in generating the SURF descriptors that will be used in the end system. Each descriptor uses information captured by the images as suggested in [8] and [9] to create the data that is needed for the realtime image recognition process. An initial version of the descriptor is generated automatically and the user is guided through a series of iterations whose objective is to refine this initial information, thus producing a better, more efficient, descriptor: by iteratively modifying selected parameters, and using the leaves in front of the camera, the expected results are compared to the effective ones, thus identifying the needed modifications to the descriptors.

At the end of the process each one of them is associated to a series of keywords establishing a taxonomy whose nodes are associated to the visual elements of the various types of leaves.

This taxonomy is used in the CMS. The CMS is implemented using a customized version of the Wordpress content management platform. The taxonomy produced in the previous phase is reproduced inside Wordpress under the form of a “customized taxonomy”. Using the standard features of the CMS it is, thus, possible to associate multimedia content (videos, sounds, texts, documents and interactive experiences) to each part of the taxonomy and, therefore, to the visual elements of the types of leaves that have been added to the system.

The service infrastructure is used to bring all parts of the system together for the usage experience. A series of software components that can be readily integrated into iPhone applications connect to the device's webcam and enact the realtime feature recognition process. When a leaf is recognized, its identification is translated into a series of terms in the custom taxonomy and relevant content is fetched over the network by interrogating the modified Wordpress CMS. The multimedia assets are then progressively shown onto the smartphone's viewfinder, coherently with the realtime onscreen position of the leaf.

Results

Leaf++ has proven to be effective in realizing an experience in augmented vision, applied to the possibilities offered by creating augmented reality layers of information and interaction onto the natural environment. The open platform produced during the project is currently being used for two specific purposes:

- an education platform
- an art performance.

The education platform enables teachers and students to add information about the plants in their environment directly onto plants' leaves. This allows all subjects involved to create ubiquitous education, knowledge sharing and information dissemination processes. At FakePress Publishing we are currently using the platform to create ubiquitous publications on the themes of ecology, sustainability and food and dietary education, producing information facilities that are ubiquitously accessible about the natural seasonal availability of vegetables, their origins and characteristics, creating enjoyable, suggestive and interesting ways to re-connect with the knowledge and traditional wisdom about food and environment which is progressively being lost in our urban ecosystems.

Leaf++ is also being used for the execution of an art performance in which the system is not connected to a set of databases containing information but, rather, to a generative audio and video engine. In this “concert for augmented leaves” the performers use the leaves in front of cameras to generate suggestive audio and visuals. The performance is currently being developed into a fully participatory experience in which the audience takes the role of the performers and is free to move around urban space and generating the audio and video collectively, by augmented-looking at the leaves that come across: a concert in the Third Landscape.

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WIND, RAIN, AND PROLIFERATIVE PRESERVATION

Jon Ippolito

Generally considered a culprit in the destruction of traditional human artifacts, nature may end up serving as the inspiration for such new automated paradigms for the perseverance of culture. Yet, as successful as genetic algorithms are in preserving the information stored in the DNA of living creatures, harnessing genetic algorithms to propagate human artifacts would breed a new host of ethical questions about authenticity and responsibility.



Fig 1. Karl Sims, Evolved Virtual Creatures

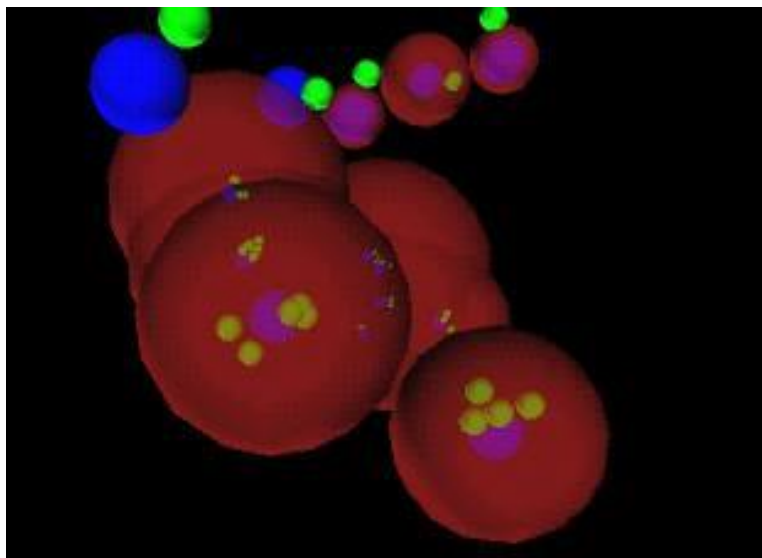


Fig 2. Tom Ray, Tierra

"If you take the Christian bible and put it out in the wind and rain, soon the paper on which the words are printed will be gone. Our bible is the wind and rain."

--Salish elder [FN]

The organic archive

The word "archive" usually brings to mind hardware—shelves of solander boxes, racks of server boxes—or software—arrays of bitmapped images, frames of digital video, folders of Word documents. This paper considers the potential for an archive based instead on wetware—one that imitates the algorithmic processes of biological perserverance, if not its actual membranes and mitochondria. An organic archive would preserve via unorthodox processes like genetic replication and mutation rather than storage and migration. So it's worth speculating whether organic processes might help preserve information-based culture in all its forms.

Digital tools like GarageBand and GIMP may grant today's remix artists the power to proliferate culture, but this power pales by comparison with the fecundity of genetic processes. From natural ecosystems to synthetic genomes to genetically engineered algorithms, evolved systems are able to calculate, create, and copy with a robustness that remix culture cannot match; given the new millennium's obsession with genomics and biomimicry, evolutionary paradigms are likely to play an increasingly important role in many disciplines in the coming decades. Our individual memories are organic, after all—why shouldn't our social memory be?

DNA as archive

Archives that live and breathe are the beneficiaries of evolution, which is the tendency for natural processes to promote stable structures. As a consequence, an organic archive doesn't need conservators and librarians to tend it, but given the right combination of energy and nutrients can reproduce itself. Artists like Joe Davis have already begun exploiting this fact to preserve rudimentary artworks via biological replication. Working with researchers at the Harvard Medical School and University of California at Berkeley, Davis encoded a Y-shaped symbol for fertility into DNA, and then inserted this "info-gene" into the chromosomes of otherwise ordinary *E. coli* bacteria. Left to reproduce in test-tubes in a lab, Davis's microscopic studio assistants soon reproduced billions of copies of this rune simply by dividing and making more of themselves. "I'm the most published artist in history," said Davis. [FN]

So what if you want to preserve an entire collection, rather than a single work? In a 2007 conference at the University of California at Berkeley organized by Richard Rinehart on "New Media and Social Memory," Stewart Brand and Kevin Kelly suggested that we might encode the Library of Congress in DNA [CK]. This proposal is essentially Joe Davis' infogene writ at the scale of an archive rather than an individual artwork.

DNA has shown potential as a computing medium for parallel-processing [FN: Square roots], to be sure, but a vat of DNA has a mind of its own, and is unlikely to treat cultural preservation with any more respect than it treats blue eyes or other desirable condition. DNA is transformative—partly via mutation, partly via sexual reproduction—and this fact is essential for its role in evolution.

That makes trusting preservation to an actual organic system is a dicey proposition. Of course, you could try to preserve the Library of Congress in a jar of DNA that's frozen; this would prevent it from mutating very much but not be a big improvement on storing it on a hard drive. To harness the power of an organic archive, you need to harness evolution's power to proliferate, which means either trusting replication to an actual organism (like Joe Davis's *E coli*) or an artificially stimulated evolution using manual processes such as polymerase chain reaction or exposure to ultraviolet radiation. In this case, a strand of DNA encoding a bitmap of the *Mona Lisa* wouldn't sit still in a vat of genetic goo, but would unzip and zip its halves promiscuously with other strands, replicating and mutating.

Synthetic genomes

Of course, it usually takes a lot of time for nature to evolve stable systems. Yet if evolution is really the cause of organic stability, then time measured in years or millennia is less relevant than time measured in generations—for it is by mutation and testing that organic stability arises.

Fortunately for future preservationists, not all evolution has to happen on glacial time scales. The short lifespan of the fruit fly favored by genetic researchers, *Drosophila melanogaster*, is compensated for by its precociousness, with the result that geneticists have been able to observe evolution at work in the laboratory because each new generation only takes a week to mature. As exciting as it may be theoretically, encoding cultural data in a genome is rather impractical. It's not trivial to extract the DNA of a fruit fly just to look up *Moby Dick* in the Library of Congress, much less to figure out whether its words have mutated along the way.

There's a much less messy way to exploit genetic proliferation. Researchers have experimented with digital equivalents of such fast-breeding organisms, called genetic algorithms. And they have gone further by setting the parameters by which such virtual creatures evolve. Such "fitness functions" vary depending on which traits the researcher wants to encourage. Might it be possible to design such a fitness function to encourage the perserverance of digital culture?

Fitness functions

As in so many radical approaches to preservation, artists were there at the outset. To create his *Evolved Virtual Creatures* [FN], artist Karl Sims used a random number generator to create mutations in a series of boxlike shapes whose movements and articulations were also determined by their genetic makeup. Sims then ran these creatures through a series of tests, each corresponding to a different fitness function: Which creature could swim the fastest? Which could win a hockey game?

By breeding successful mechanisms together, Sims stacked the deck so that the winners in each category were more likely to pass on their genes to the next generation of creatures. To be more specific, as each creature was represented by a simple computer algorithm, Sims interspliced the formulas for these algorithms to produce new formulas that are in a genetic sense the offspring of the older algorithms. As a result after a hundred generations [FN: <http://www.karlsims.com/papers/siggraph94.pdf>], Sims' bizarre creatures could perform their tasks with recognizable competence—even though Sims never designed them to do anything except evolve according to a particular fitness function.

Of course, as intriguing as Sim's system is, it's less a means of preserving forms we already have than a means of inventing new forms—a sort of eugenics program for art. Fortunately, even if you don't want your artwork evolved by organic processes, they may still help generate the software necessary to preserve it.

Danny Hillis and others have experimented with similar processes to evolve useful software, such as word processors. [FN] What if such an evolutionary system were trained not to create a faster or more efficient word processor, but to create a more stable one, that could work in a wider variety of documents and operating systems? This strategy would shift focus away from preserving individual artifacts and toward setting up the rules necessary for evolving an ecosystem capable of withstanding unpredictable changes in technology. If the word processor is the figure, its technological context is the ground, and they must complement each other if the ecosystem is to endure.

We know how to write the figure—a word processor—with code. But how do you model the ground—those unpredictable changes in technology? We can turn to a helpful metaphor from evolutionary biology that explains how individual species and fitness functions interrelate: the Epigenetic Landscape. [FN:17]

Wind and rain

Biologists invoke the Epigenetic Landscape to depict the way the development of an organism can be subject to genetic and environmental forces at the same time. Imagine a stretch of land in which dramatic peaks and valleys have been formed by powerful seismic forces; different populations live in the various valleys of this landscape, out of touch with each other due to the intimidating ridges that separate them. In this visualization, seismic forces represent genetic influences, which tend to segregate species into incompatible gene pools; hence birds and reptiles can no longer mate, even though they evolved from a common ancestor. Nevertheless, the behavior of the population is not determined solely by this seismic topography, for rain and wind can erode previously impassable peaks down into humble hills more easily traversed by the landscape's inhabitants. In this metaphor, the wind and rain represent environmental influences, which tend to encourage the evolution of new species through dramatic climatic change. (Paleontologists hypothesize such a cataclysm to explain the sudden extinction of dinosaurs and diversification of mammals 65 million years ago.)

How might this abstract model be applied to evolve a more adaptable word processor? The organisms on the landscape—variations on word processors—might be interbred to produce new variations, and those judged best able to display various documents would pass their code onto the next generation of word processors. Meanwhile, in addition to a predefined set of technical conditions—from, say, a Wordstar file in Windows 3.11 to a NeoOffice file in Mac OS X—researchers might expand the test by adding some wind and rain—random samples from an algorithmically generated set of documents and algorithms. In this way, the resilience of display software could be tested against technical contexts that don't yet exist. [FN: Lanier]

The ethics of genetic preservation

This vision of self-evolving, future-proof artifacts is heady. But it's also hazardous, because it plays into our society's increasing reliance on genetic modification for innovative solutions without regard for the long-term effects. While pharmaceutical research has produced blight-resistant crops and new tests for

cancer, it has also produced suicide seeds and antibiotic-resistant germs. Genetic modification has had a similarly mixed effect on preservation. Scientists by 2009 had created a living clone of an extinct species by transferring cell nuclei from the preserved skin of an extinct Pyrenean ibex into the eggs of a contemporary goat. In the same year, however, the US Food and Drug Association approved the sale of the pharmaceutical protein antithrombin produced in the milk of genetically engineered goats—in effect, engineering a new species of mammal for the sole purpose of delivering cheaper drugs, a practice known as “pharming.” Given the limited resources on planet Earth, the fact that genetically modified creatures can often outcompete their natural cousins [FN: Wikipedia on Genetic Engineering] suggests that tampering with biological systems could reduce their diversity rather than amplify it. It may be that biotechnology does not support the **both/and** logic of digital proliferation but reverts to the **either/or** logic of analog space.

To harness the enormous parallel processing capability of a virus or cell is to play with fire; the same potential for explosive and unpredictable growth that makes genetic processes attractive as a preservation strategy also makes them a potential danger to existing creatures and their ecosystems. Critics such as Jeremy Rifkin question whether humanity is mature enough to wield the power of genetic processes responsibly, given their unpredictability and proliferative potential. Even technologists such as Bill Joy have expressed concern over the “gray goo” scenario, a doomsday endgame in which one species wins the zero-sum game of a planet with limited resources. In this hypothetical future, researchers accidentally unleash a self-reproducing, evolving machine or organism that overwhelms the natural (and possibly the built) environment, covering the planet with a kind of gray goo that obliterates the rest of the animal and vegetable kingdoms.

And what of the preservation of genetic artworks such as Eduardo Kac’s glow-in-the-dark bunny or Davis’s runish bacteria? Allowing them to breed uncontrollably in the wild may be the best way to promote their perseverance, but it accords these artists with a power far beyond what artists are accustomed to, even in the age of the Internet. Although the biotech industry would prefer we didn’t notice, genetic materials are among the most powerful “weapons of mass destruction” available today. So how could archivists exploit nature’s proliferative powers without endangering nature herself?

As important as the task of preserving human culture may be, we have already seen the effects of its being **too** preservable: landfills piling up with plastic toys and rusting automobiles, pharmaceuticals showing up in breastmilk, and space junk crashing down from orbit. In our experiments with organic forms of preservation, we should make sure that our zeal to leave behind a permanent footprint doesn’t end up squashing nature in the process. Sure, it might be possible to encode the works of Shakespeare into every schoolchild’s DNA for their future reference—but what unintended consequences might this have for our evolution and our planet? Even a self-evolving word processor, while it sounds innocuous, could mutate into a virus that overran every desktop on the Internet.

Emulating ecosystems

One safeguard that might be worth exploring is built into Tom Ray’s *Tierra* project, a self-proclaimed “wildlife sanctuary for computer viruses” that simulates evolutionary processes in software. By creating a virtual petri dish in which snippets of code can mutate and reproduce, Ray harnesses a similar power as artists like Davis or Kac, as he cannot predict the outcome of the microscopic orgy committed by his computer programs. For example, to explore their behavior across a range of silicon ecosystems, Ray built a system that allowed his viruses to email themselves from server to server across the dispersed

harddrives of his collaborators. Once set loose in this closed network, Ray's critters decided to circumnavigate the globe. Remarkably, they became a nocturnal species, always seeking the dark side of the planet where they could take advantage of CPU cycles left unused by a computer's sleeping user.

When challenged that he might be endangering everyone else's computer network if one of his viruses ever escaped captivity, Ray replied that the emails [FN: Synthetic Ethics] bouncing around between servers did not contain any code that was executable on its own, but only within the specialized runtime environment of the *Tierra* software architecture. To employ a term from contemporary preservation, Ray's critters live in an **emulated** world. Programs running in emulation don't have direct access to real hard drives; they just think they do. If I download a virus into a Windows emulator, it can eat up my emulated resources, but won't have access to my real resources if I don't want it to.

So it may be that combining the security of emulated environments with the power of genetic replication could provide a safe and powerful future for cultural preservation. Transgenic Canola plants engineered to outcompete their feral cousins have extinguished their competitors in the field [FN: Wikipedia *ibid*], but a genetically evolved word processor on one hard drive needn't automatically erase an older word processor on another hard drive.

Nature: from culprit to collaborator

It is hard to imagine nature playing a positive role from the standpoint of today's archives, with their banks of manila folders and solander boxes arrayed against nature's will to entropy. Yet in the long term it may be that archivists will no longer be able to resist letting natural processes in the door—maybe even the wind and the rain—either because of their amazing powers of perseverance, or because the artifacts under their care are increasingly created with such natural processes. At that point perhaps the archive may aspire, like so many of our current institutions, to find a way to cooperate with nature instead of working against it.

[This paper is based on material from the forthcoming book *New Media and Social Memory* by Richard Rinehart and Jon Ippolito (MIT Press).]

References and Notes:

[Original source mentions: "To come"]

WET PAINT

Vicky Isley & Paul Smith (boredomresearch)

boredomresearch explore the natural progression from static imagery allowed by recursive technologies which enable data to remain liquid. The artists Vicky Isley and Paul Smith often think of themselves as employing computer gaming technology to create landscape paintings and life studies that move. In this paper the artists will discuss their computational systems which manipulate data chunks to produce a diversity of moving images.



Lost Calls of Cloud Mountain Whirligigs (detail), 2010, boredomresearch, software artwork, 60 x 49 x 2cm. ©boredomresearch, courtesy of [DAM]Berlin/Cologne.

Introduction

Here we will discuss the impact technology has on our practice, breaking the stillness of static image creation as we respond to the unique potentials that computational technologies make possible.

We are artists not technologists and our practice is not situated on the cutting edge of technological innovation – it is however responsive to the new possibilities present in current technologies. We employ computation in our practice to extend the heritage of painting. Computation allows for the creation of artifacts that can remain fluid and open in contrast to the medium of paint that dries; becoming fixed and stable. There is nothing exceptional about our adoption of these technologies as they are now more freely available than the traditional tools and materials used by painters. We accept them as a natural and inevitable progression, but one that may require some new approaches to the creation of art.

Many artworks we make rely on the iterative nature of computing creating each frame of an animation just in time to be seen. This is similar to a game engine where each frame is created in response to the changing state of play. Another aspect of games is their use of AI to provide game play with a synthesized opponent. The artworks we will refer to here include the AI component without user interaction. The entities exist in a closed universe interacting with each other; each frame created as a consequence of these interactions. Like paint that never dries the canvas remains fluid and open, rearranging and re-

composing itself thirty times a second. Film and animation bare more in common with paint, in that despite being animate, each discreet frame remains stable, identical and loyal to the artistic choices of its author. In contrast each frame in our work lasts for a fraction of a second before being discarded.

THE RISK AND REWARD

This ability to break from the stillness of previous media offers us something fresh to explore. We are able to make life studies that incorporate and respond to the processes present in natural systems by modeling aspects of them in code. We first explored this in our computational work 'System 1.6' [1] where the behaviour of the forms bring a sense of life to the work rather than their visual appearance.

'System 1.6' uses artificial life algorithms to construct a live visual and sonic composition that is different each time its played. During production this required different considerations to artworks that remain constant as we were dealing with a composition based on probability and likelihood. There were many emergent properties occurring, not as a direct consequence of the coded instructions but from the complex interactions of a large number of autonomous bodies. Small changes to the code could trigger a cascade of unpredictable events giving results inconsistent with our artistic vision. The only way to be sure our modifications were effective was to observe the work, sometimes for hours or days. It was more a case of nurturing behaviour than creating it directly. The artwork was finished when we felt reasonably confident it would perform well over an extended period of time. 'System 1.6' could run indefinitely without the interactions repeating but the forms themselves remained constant. In nature, life forms gradually shift and change giving rise to the vast diversity that exists.

Our artwork 'Biomes' [2] contains creatures that use a rule based system to form intricate patterns on their bodies. The rules are generated randomly from a vast range of possibilities. During development we were keen to explore these possibilities over an extended time frame. The problem was only a small proportion of rules created patterns, of which even less were rewardingly intricate. To solve this we introduced a virus like component that would move around the world killing off creatures with non-intricate marks. The proportion of creatures with complex patterns increased over time reaching a plateau. From then most creatures exhibit a level of complexity defined by the virus's selective pressure; with the occasional simple one slipping through the net. The cost of limiting the work to only those creatures that have a certain degree of complexity is that some interesting but simple forms are lost; while some complex but unrewarding forms remain. This constraint did not stop the 'Biomes' exploring a huge diversity comparable to that which exists in nature.

We had shifted from making exact choices, describing precise qualities, to creating environments that nurture interesting forms and outcomes. The more freedom we gave the work the greater potential for interesting and surprising results but with increased risk for periods of blandness, or worse, collapse.

The 'Biomes' have natural cycles of activity, not dictated by us, but emerging from their behaviour. Normally this alternates from moderate periods of tranquility to intense action. Very occasionally a 'Biome' can fall quiet for an unusually long period of time. Creatures can develop motion paths bypassing the small part of their world that can be seen. If a number of creatures develop this trait it can prevent others entering the visible area, causing an ice age of inactivity, weeks can pass without a single machine being seen. Whilst interesting, this naturally occurring phenomena, may not make for a rewarding experience in a week long festival context.

JUST BREAKING THE STILLNESS

One of the greatest potentials of creating artworks that remain fluid and open is their ability to throw up the unexpected – injecting some surprise into work that would dull with familiarity. Surprise is a double edged sword. During the development of our artwork 'Lost Calls of Cloud Mountain Whirligigs' [3] we were surprised to find our flying creatures 'Whirligigs' all in a deep sleep from which they would never wake. The challenge we face is balancing the reward of leaving artworks open to change, without it being terminal. In 'Lost Calls of Cloud Mountain Whirligigs' we have chosen to blend together elements that remain open with those that are fixed; elements that repeat in regular cycles, with behaviours that will never repeat.

The 'Whirligigs' represent a study of a narrow facet of diversity – they live and die with each new family exploring a seemingly infinite range of song, colour, form and pattern. Because their ability to change is constrained, they will always look like 'Whirligigs'. Like the order of insects Lepidoptera which presents a vast amount of diversity whilst maintaining an overall visual consistency. Within this tiny slice of diversity there are more possibilities than anyone could view in a life time, even if they did nothing but sit and watch 'Whirligigs'.

In the artworks we have discussed here we have attempted to employ ubiquitous contemporary technologies to break the stillness of traditional forms of representation, whilst remaining true to a heritage of artistic practice that observes and is inspired by nature, its forms, behaviours and long term ability to change.

The medium of paint has given artists thousands of years of possibility. The comparatively new medium of computation now challenges artists to find meaningful and rewarding ways of incorporating its capacity to remain fluid in their practice. We continue to be excited by these possibilities and proceed to tentatively exploring this, as yet, scantily charted terrain.

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2. *boredomresearch's image documentation of the 'Biomes', computational systems produced in 2005, <http://www.flickr.com/photos/boredomresearch/sets/72157627084479926/show/> (accessed Sept 09, 2011).*
3. *boredomresearch's image documentation of the 'Lost Calls of Cloud Mountain Whirligigs', computational systems produced in 2010, <http://www.flickr.com/photos/boredomresearch/sets/72157624031085199/show/> (accessed Sept 09, 2011).*

FROM STILL TO MOVING: AN ALMOST INDISTINGUISHABLE MOMENT

Cynthia Lawson Jaramillo

I challenge the traditional definitions of photography and film through work that is situated in that very short moment when still images become moving and therefore not definable as just one or the other.

Furthermore, I argue that in this fast-paced era in which 24 hours of video are uploaded to YouTube each minute, that in-between moment has become almost indistinguishable.

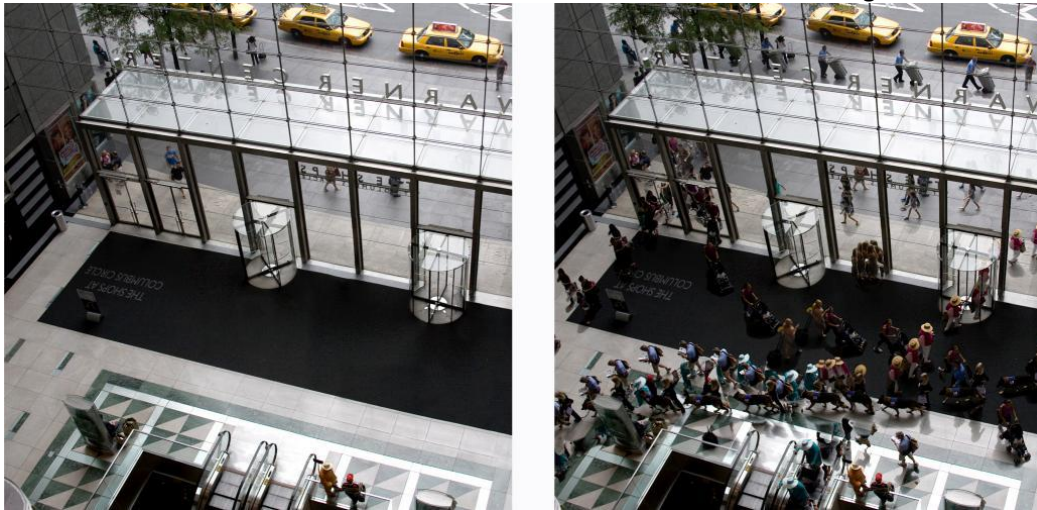




Fig 1.-3. Details from The Shops, 96 Seconds #1 and The Shops, 96 Seconds #36, 2010, Cynthia Lawson Jaramillo, Archival digital prints, 19in x 13in each.

INTRODUCTION

Analyses on film and photography often characterize the photograph as a still image and film as a sequence of images. [1] I challenge these notions through work that is situated in that very short moment when still images become moving and therefore not definable as just one or the other.

In this paper I specifically discuss the principal techniques I incorporate into my image-based works, such as digital and physical layering, which push each piece as far away from the “still image” as possible. I question our capacity to perceive slow changes and multiple temporalities through works that explore both. Furthermore, I argue that in this fast-paced era in which 24 hours of video are uploaded to YouTube each minute, we have lost our ability to slow down and perceive small changes.

The work of contemporary artists such as Bill Viola, David Hockney, and Hiroshi Sugimoto offer a framework for my own artworks which I describe as photographic works in motion, which exist more as time-

based media that incorporate photography as a vehicle for the production of images, and less as photographs that pause time.

CHALLENGING TIME AND SPACE

“Time has begun to be experienced as something infinitely elastic, in which the relationship between past, present, and future becomes open to human intervention. Similarly, space is no longer a static field that we traverse over time, but has become a medium to be dismantled and reassembled at will.” [2] The photography work that is here described challenges time and space, and often uses the camera as a tool to create process-intensive work that goes beyond a static framed print mounted on a wall. Specifically, as a time-based artist, I work with photography as a tool (and not necessarily a medium) to create works that push the traditional boundaries of space and time with still images questioning how “still” they actually are. Typically, photography that moves beyond the pausing of time, and instead extends or challenges it is then considered film. Sequences of images are described through the lens of film (and not photography) and are critiqued in that light. Furthermore, seminal works like Chris Marker’s “La Jetée” do not neatly fit into either photography or film. [3]

David Hockney’s photographic collages and composite polaroids from the early 80s were a testing ground for new possibilities in photography and for a lot of the approaches in the era of digital technologies (both in cameras and in software.) His 1983 work “Photographing Annie Leibovitz While She Photographs Me” is both exemplary of this experimentation as well as a criticism on “classic” photographs. The far right side of Hockney’s composition has a small square image that is the photo Leibovitz took of him. This juxtaposition illustrates Hockney’s argument that a “single-eyed photograph” (as he describes Leibovitz’s image) would never have the quality of a painting in “that you can go on and on looking at these pictures.” [4]

Hiroshi Sugimoto’s “Theatres” are a series of images produced by maintaining a long exposure while photographing a theatre during a film screening. The light from the film’s frames light up the space, and the screen is white. This series “runs counter to prevailing conceptions of photography’s relationship to instantaneity and to the photographic image as the record of a brief and transitory moment in time. Here the photograph is, in a literal way, the embodiment of temporal duration – in a manner that has rarely been so since the infancy of the medium – and equally it would seem to demand of the viewer a form of attention that also takes time.” [5] Are works like this one truly still or do they have an extended duration equal to the film captured?

Finally, Bill Viola’s “The Quintet of the Astonished” from his series “The Passions” is the perfect work to refer to the power of the still frame (in his case of slow motion video) as well as an expanded sense of time. Viola invites viewers to slow down their internal momentum, to pause and take the time to view his work that also takes time, since each video in this series has been slowed down – both a reference to painting from which the works are inspired as well as a refreshing critique of our moving image-saturated lives.

I have developed two techniques to challenge the before mentioned traditional notions of photography and to position it as a time-based medium (in which images are in between still and moving).

LIGHT BOXES

My works presented through light boxes are spaces captured over time through physically layered and transparent still images. I challenge the notion that “the photograph is thought to extract a moment from the flux of time, to cut out a slice of a time-space continuum and thus to have no duration of its own – in a sense a photography only lasts as long as we are looking at it.” [6] Furthermore, the work challenges the classic notions that in photography one experiences equilibrium of our physical world’s “rhythm.” [7] Instead, each layer may be a time-slice, yet the superposition of images onto one another breaks the neat slicing, and the viewer finds himself or herself in constant motion – moving from one layer to the next as they experience one space over time.

Sequences of images that could be collaged digitally to create one print are instead presented as physically collaged, almost sculptural, backlit objects. A photo shoot (in which I take several photos, spaced at even intervals, from one same location although without a tripod) then translates into several prints on transparent film. I document spaces over time and present these images layered one on top of the other (the most recent in time closest to the front), and with a sheet of acrylic in between. This materiality gives the work a physical depth representing its temporal depth (the longer the total time captured, the thicker the work.) The last (or oldest in time) image is printed on a milky translucent film that allows the passing of light without revealing the light source behind the images.

These works can be described as cubist in that they contain “what was really occurring when Cubists broke up an image into multiple perspectives, thereby presenting, at one moment, a set of views that would normally be viewed successively over a period of time.” [8] More importantly, it is in the relationship between the images (on various layers) that time is produced. [9]

This technique was developed after visiting Tokyo and photographing the rush hour chaos in the large train station Shinagawa. Upon reviewing my images (and frustrated that I did not have a video camera with me) I wanted to be able to represent this experienced motion through the still images and I first superimposed them digitally.

My practice intends to slow viewers’ sense of time by protagonizing the everyday as defined by transient space and make them aware of their own quotidianity. It is my hope that the viewer will reflect on their own existence, and become hyper aware of the small moments from which we now quickly disconnect: the stranger passing by carrying groceries, the voicemail awaiting to be heard, commuters rushing to catch the train. The places captured (airports, train stations, subway platforms, entryways) are spaces which exist solely as transitional spaces – they have no function other than to facilitate the flow of people from one point to another, and it is this flow that heightens the everyday quality of the works.

HIDDEN CHOREOGRAPHIES

In “Hidden Choreographies” (“Pompidou from Above, 6 ½ Seconds” and most recently, “The Shops, 96 Seconds”) I address the concepts of time and space in a single location. In multiple photographs, the repeated (and extracted) presence of figures in each frame demonstrates that these apparently different moments actually happened in the same place and at the same time. The chaos and complexity that one would not necessarily witness when viewing a transient public space, in which nothing seemingly happens, emerges through in the relationship between the images. Although shot in half-second intervals, viewers perceive the resulting piece through the expansion of time in transient public space. As de-

scribed by Michel De Certeau, “The act of walking is to the urban system what the speech act is to language or to the statements uttered.” [10] The urban landscape is continually in motion (via its pedestrians) and it is this motion that this work documents.

The second body of work in this project is the 36 prints from “The Shops, 96 Seconds #1-36”. These works are digitally collaged based on 42 original photographs taken in the span of 96 seconds from inside the Time Warner Center in New York City's Columbus Circle looking down on one of its entrances. The repeated (and extracted) presence of some figures in multiple photographs connects the thirty six prints as a series and demonstrates that these apparently different moments actually happened in the same place and at the same time. This technique has been described as “collapsing the law of physics on the gallery wall” [11] and it is precisely the uncertainty of what is real (and possible in our spatiotemporal frameworks) and what is not that I aim to question.

In this series I am interested in photography as a way to capture moments and, through their representation(s), extend their time. The thirty-six images of the series are digital recreations. Each of forty-two original photographs was studied, from which “actors” like the woman with the seeing-eye dog were identified and digitally removed. Then, a base image was selected and used as a “stage.” Positioning the “actors” into several of their moments then composed each image. Each person appears where they were at some point during the photo shoot, but there are clearly overlapping moments. The viewer of the work is challenged to understand if people were digitally placed or repeated, or even if it was a staged documented performance. The resulting thirty-six images are the first of over a billion combinations of these “hidden choreographies” and it is this spatiotemporal transformation that shifts the series from a photo shoot about the everyday to something worth observing, remembering, and capturing. The collaging is what adds time to each print, instead of presenting the moments as “fixed, unmoving events that is the still photograph.” [12]

An important process in this work is that these moments are actually not choreographed but found. This particular series was documented because of my interest in the framing devices I saw through the lens (the revolving doors as interfaces between the inside and outside.) Only once the images were in the computer did I select the protagonists of the work and found those moments that make the work interesting. The series is organized very specifically – first the empty stage, then a base stage common to all following images (with some people static), followed by the introduction of each actor – the woman with the straw hat, the janitor pushing a trash bin, the woman with a shopping cart, the tourist reading his guide, etc. Once all actors are introduced, they are combined in a variety of ways creating overlaps of time and space that didn't actually take place, but could have, such as the power mom with the stroller bumping into the blind woman with the seeing-eye dog.

In both “Hidden Choreographies” series, viewers have expressed perceiving contrasting concepts. On the one hand there are those who feel that the repetition of the people walking through emphasizes the quotidian in their actions, and the meaningless of each. Others feel that the repetition, and the extraction of select pedestrians as “actors” gives them a certain protagonism therefore heightening the importance of their everyday activity (walking home, going grocery shopping, meeting up with a friend.) I have been asked if the work is based on a particular piece of film or theatre. Although it is not, I do see a connection with Francois Truffaut's “Day for Night” in its opening scene, in which he is directing a movie and staging an ordinary city scene (pedestrians on a street walking, cars driving). You're seeing a film within a film and are very aware of the staging of pedestrians, cars, and their movements & interactions in public space. The other film to which I see a reference is Jacques Tati's “Play Time” in that it follows one man (potentially the “Man with the Red Suitcase” from my “Pompidou from Above, 6 Seconds”) in

spaces of a city and the choreography of that movement in relationship to the built environment. Of my first series, gallerist Christina Ray has written that it has “no start, no finish, and no story. The artist simply stops time, putting a six second hold on the public and then releasing it to dissolve back into individual realities.” [13]

This kind of work, if presented on a timeline (on video or in Flash, for example) would directly reference cinema (short animations, or even the more recent animated gifs) and even Muybridge’s early photographic experiments. It is of interest, however, to challenge definitions of time-based media. Can a work such as this one, that includes moments from across a timeline, and yet is not presented on one, be considered time-based? And as prints, does it fall under the category of still photography?

CONCLUSIONS

In the culture of interruption in which we live, many people have lost the ability to sit still and lend their time to still and slow-moving images. Younger generations are growing up in front of interfaces in which messages from at least four sources are constantly streaming in and fighting for their attention. As an artist I am committed to promote an internal slowing-down of art viewers’ momentum by creating works that contain a duration which require a similar time commitment from the viewer. Digital and physical collaging have served as my principal techniques to create still works that are in constant motion, and which challenge the traditional expectations of photography as a medium that pauses time. My light boxes and printed series exist in the moment in between moving and still images, and my hope is that that moment regains the spotlight and that viewers may be able to be still and really see what is in front of them, one frame at a time.

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TECHNOLOGIES OF MEDIATION AND IMMEDIATION

JANIS JEFFERIES

The word medium, media and mediation, have a strangely double aspect. On the one hand, a medium acts as an enabler connecting things that might otherwise be completely disjointed. On the other hand, a medium is something that palpably stands between.

The word medium and its cognates, such as media and mediation, have a strangely double aspect. On the one hand, a medium acts as an enabler, as a bridge, connecting things that might otherwise be completely disjointed. On the other hand, a medium is something that palpably stands between. Mediated experience is always second-hand; mediated experience is, by definition, not immediate.

Even air as a medium through which we apprehend the World distorts. David Hockney, the painter, was concerned about this aspect, for example. In the late eighties he preferred photocopiers to cameras as he felt that the images produced by the latter were largely pictures of the air between the camera and the subject.

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ECOTOPIA, TOWARDS AN ECO-SOCIO-MORPHOLOGY

Bin Jiang & Sara Franceschelli

This paper presents a urban design project of insertion of a restoration system into the city to accelerate recycling and regeneration of the system. This restoration system consists of a series of eco-machines which are not isolated from each other but are making up an “eco-tribe”, that could rehabilitate the urban ecosystem with eco-technologies and eventually could be integrated into the urban environment.

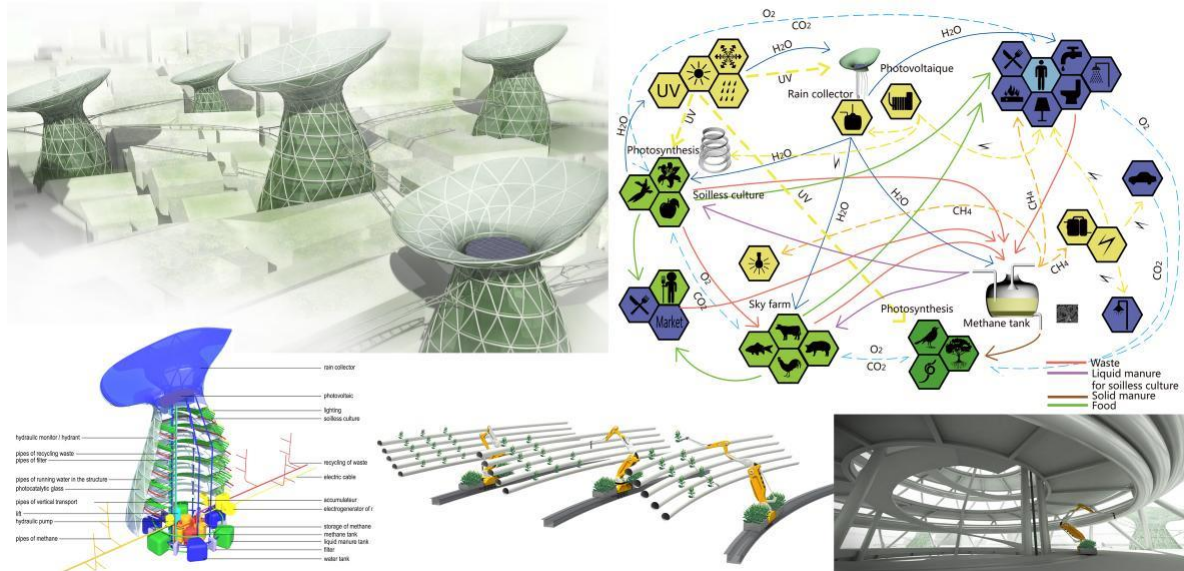


Fig 1. ECOTOPIA, 2008, digital image, Copyright Bin JIANG.

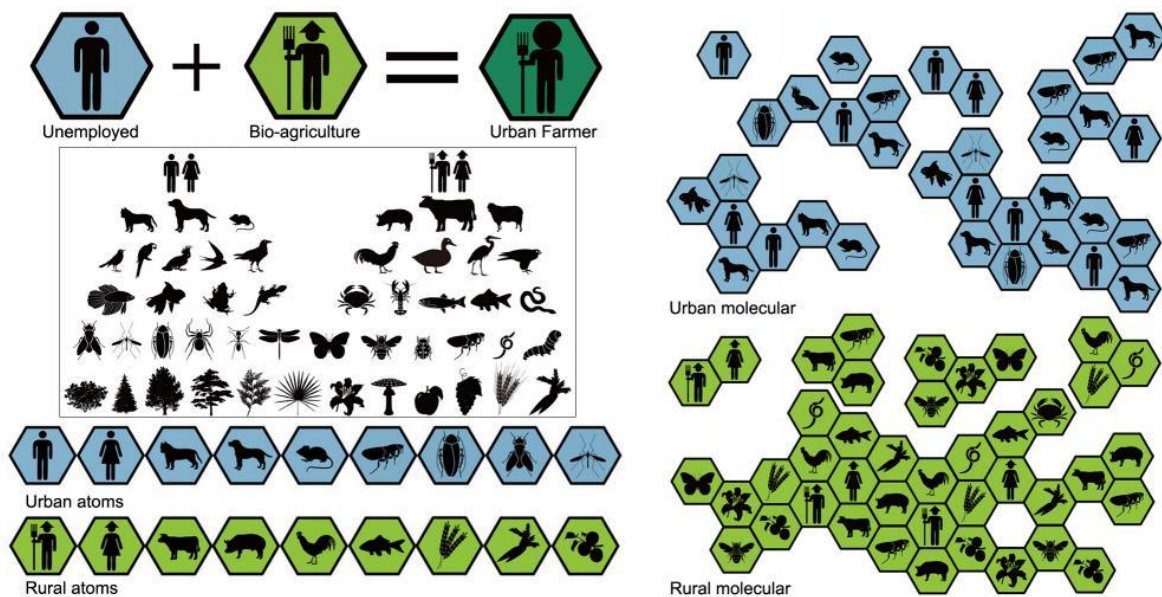


Fig 2. Semiotic system of ECOTOPIA, 2008, digital image, Copyright Bin JIANG.

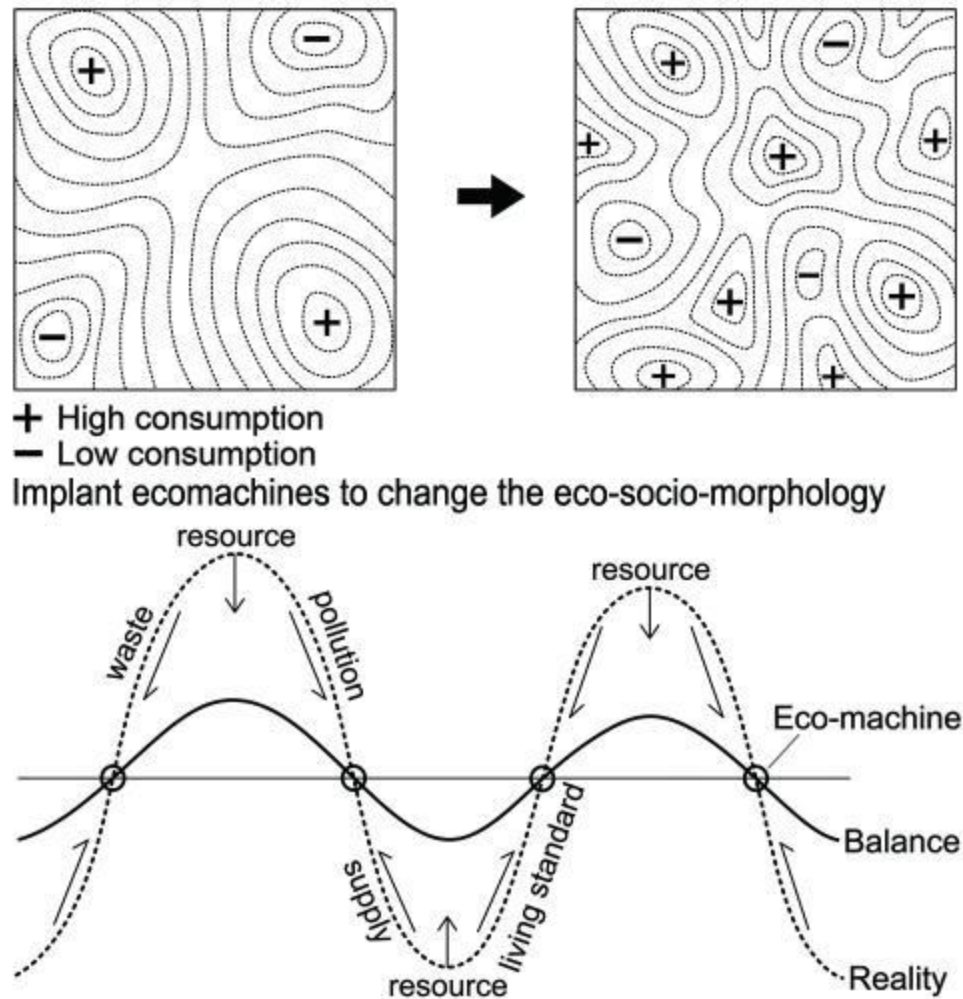


Fig 3. *Implant ecomachines to change the eco-socio-morphology*, 2011, Copyright Bin JIANG.

Today the ecosystem is suffering serious damages, due to the unbalanced state provoked by human intervention. This is the starting assumption of this paper.

We are first going to illustrate the ECOTOPIA project proposed by Bin JIANG in 2008. [1] The idea of this project is to insert a restoration system of eco-technologies in the interior of the city, where the living environment is deteriorating, in an attempt to accelerate the system's recycling and regeneration. This restoration system has been proposed together with a semiotic system, interpreting the relationship of various representative organisms in the urban, rural and wild environment. We will present the functions and the advantages that such a system should possess.

Secondly, in order to question and develop this proposition, we are going to formulate the working-hypothesis that the restoration system could be seen as a network of dynamical perturbations injected at a certain scale into the city, intervention that could modify the ecosystem of the city as a whole. We will develop this idea on the basis of a structural – although dynamical - interpretation of the metaphor of landscape, coming from theoretical biology. Without taking into account the semantic connotations that could be associated to this metaphor, in the context of theoretical biology. We consider looking at the initial ECOTOPIA project, structural and morphological properties of landscapes.

The Gaia hypothesis, [2] a theory announced by James Lovelock in 1969, but also exposed by Johannes Kepler in the 17th century, alleged that living organisms on our planet worked according to certain self-recycling rules which can satisfy their own needs within a gigantic organism called Gaia (named after Gaia, Greek goddess of the Earth). Two centuries later in 1924, this theory got backed by the concept of “biosphere” [3] raised by Viadimir Vernadsky who had also realized for the first time the undeniable connection between deforestation and climate.

The natural ecosystem possesses certain self-restoration abilities and this kind of restoration needs a certain period of time. The traditional agricultural production is based on cycle of nature and natural resource processing, which is a mode of production conforming to the nature’s rules. On the contrary, we have entered into the industrial era which is developing at fast pace. Under such circumstances, the pressing production cycle does not allow the necessary duration for the nature to restore itself, which means that the producing capacity of the industrial society has gone far beyond what the nature can bear. In the long run, the serious ecosystem imbalance is inevitable.

The industrial production can devour natural resources of huge volumes in a short period of time and furthermore, it can change chemical structures or biological genetic structures of natural materials. As a result, the nature is also overwhelmed to achieve the self-restoration in time. Though some damages are irreversible, at least during one generation, the project of inserting urban ecosystem into the global natural ecosystem as a part of industries, could make a change. The industrial society and the environmental pollution actually coexists with each other inseparably. Without any doubt, the problem of pollution arises along with the rapid development of industry.

The ECOTOPIA projet intends to insert a restoration system into the high density city. The leading idea of this project is that the eco-architectures forming the restoration system should be curative, intervening as living machines. They should be inserted into cities and be interdependent with each other, in order to develop sustainably, as in a transplant of new artificial organs to a withering ill body. [fig1]

The idea is to bring the eco-agriculture into the city as a treatment measure, in another words, to insert the eco-agricultural system into the urban ecosystem as a restoration therapy in order to cure the industrial society by the agricultural production.

This restoration system consists of a series of eco-machines which are not isolated from each other but are making up an “eco-tribe”. This could rehabilitate the urban ecosystem with eco-technologies and eventually could be integrated into the urban environment. The organized restoration system is a breakthrough from the existing patterns of the community, simulating the operation of natural ecosystems, will be inserted into the wrecked urban ecosystem and connect all communities to take effect in the range of the whole city. With self- reproduction and duplication, the system could constantly grow and evolve along with the city’s development and technology innovations.

Le Corbusier said: “The architecture bears living organisms. They present to the space, the light, ramify themselves and extend as a tree or a plant. The freedom is researched around each part.” [4] My design concept for the eco-architectures is derived from the sea anemone structure. The unit of the system is a kind of recycling tree tower, called “Sky farm”, which seems like a stretching sea anemone facing towards the sun. It will be inserted into the existing communities. In the high density city, it is difficult to find much available ground space; therefore, I choose to develop the agricultural cultivation in the vertical space. Each tower, at a certain distance from others, is connected by an overpass in the sky which exchanges energy and materials. Several tree towers form an Eco-tribe whose unit is community. In this

way, these implanted eco-agricultural machines not only could resolve many environmental problems such as reducing the emission of CO₂ and other harmful gases, eliminating organic waste, supplying clean water sources and energy, but could also satisfy food demand of community residents directly. As a result, these eco-tribes and local communities could make up a brand new harmonious and efficient eco-community without pollution.

A semiotic system interpret the relationship and composition of various representative organisms in the urban, rural and wild environment, is introduced. In order to present this semiotic system, some definitions will be useful. [fig2]

Natural Ecosystem: The biosphere is a kind of global self-sustained ecosystem. It integrates all the living organisms through various biological chains and classifies them into 3 categories: the lithosphere, the hydrosphere and the atmosphere. All of nature's movements alter the appearance of our planet by ceaseless circulation and recombination of elements.

Urban Ecosystem: The human activities have been changing the earth's appearance. Cities have come into being along with the concentration of population. In the same way, other living beings in cities have gradually altered themselves to adapt to the urban living environment. The urban ecosystem exists as an artificial link in the whole natural ecosystem and has the great impact on the latter one.

Rural Ecosystem: The rural area is a buffer zone between the natural and the urban ecosystems.

In the semiotic system introduced together with our eco-architectures, different organisms are symbolized by a representative atom. In the urban environment, residents, domestic animals and other smaller parasites relate with each other, building up an urban molecular chain. These chains combine together, engendering more complicated and gigantic compounds among which the biggest one is the social system. As for in rural environment, peasant is the basic atom, along with farm animals and agricultural plants, composing the rural molecular chains and their compounds. While in the wild natural environment, the basic unit is trees, which constitute the natural ecosystem with other wild animals, plants and insects.

On the basis of this semiotic system, some more general 'equations' can be imagined, that should define and produce the constitution of the Eco-city:

- Architect = Organizer of the production
- Architecture + Eco-technique = Eco-machine
- (Eco-machine + Bio-agriculture + Urban farmer) x n = Eco-tribe
- Eco-tribe + Existing Community = Eco-community
- Eco-community x n + Eco-system = Eco-city

The constitution of the Eco-city should perform the following functions:

1. Developing the urban eco-agriculture and restoring the urban ecosystem .
2. Initiating the system operation with the solar power in the early stage, and then maintaining the system and the supply for communities by bioelectricity: first, recycling sewage and organic waste produced from daily life and agricultural production; using the waste liquid from the methane reactor as the nutrition of soilless cultivation and livestock feed, while the waste

residues as fertilizer of public green space; generating electricity with the clean methane to meet the needs of household fuel gas, public illumination, power supply for the electricity bus and so on.

3. Sky farm: introducing the bio-agriculture, soilless cultivation, livestock breeding in a vertical space, perfecting the urban biological chain and supplying predominant food.
4. Lighting of the farm: the loop bracket of soilless cultivation turns around driven by electricity, like a revolving restaurant, in order to let all crops receive light evenly by adjusting the way of revolving and its speed according to seasons and time.
5. Tree towers with water line in them constitute a group of fire control towers in the high-density community, ready to alarm and fire-fight any time; possible to spray water directly from the tower to the house on fire or draw the fire-fighting lance to put out the fire.

The fact of transplanting countrysides in the city should provoke a restructuration of the society frame. The eco-community alters the former concepts of community, unifying the traditionally separated communities and promoting the trans-community exchanges. In addition, insertion of the eco-agriculture into the city will result in a new social type called "Urban farmer". Thanks to the leverage effect of eco-technologies, fewer farmers could provide more products, compared to the traditional agricultural production. Furthermore, the urban farmer also shoulders the responsibility of maintaining the virtuous circle of urban ecosystem.

On the other hand, the popularization of urban eco-agriculture, as a vivid textbook, would facilitate those who grow up in the city to approach the nature and comprehend the movement of natural ecosystem, thus make them realize the importance of protecting the nature and restoring the urban ecosystem to intensify their sense of belonging to the nature.

How do these desiderata can be realized? Are these 'equations' producing the emergence of new, balanced, equilibria? We think that the design of such an eco-city should comprise an analysis of the balances of the different, unstable equilibria in town. How to we switch from the point of view of the designed objects and their functionalities (expressed by the 'equations') to the point of view of the resulting equilibria in town? We follow here a line that takes into account some aspects of the figure of landscapes in theoretical biology, discussed in the framework of the Dynlan-Dynamic Landscapes research program. [5] In our research program, we are interested in the structural, although dynamic properties of landscapes. Thus, even whether we refer to images coming from the history and the theory of contemporary biology, we do not consider the semantic connotation of these figures in their original contexts. We consider them as structural dynamic images that can help in asking questions and setting scenarios. We are encouraged on this way by the structural and holistic attitude that moved Conrad Hal Waddington in the introduction and heuristic use of his image of epigenetic landscape. [6] For example, Waddington could introduce the notion of genetic assimilation on the basis of both of his experimental work and of the potentialities of landscapes images. Of course, even in our case, this work of abstraction is a first step of the research, and should be accompanied by empirical, situated, studies.

With the help of the hilly surfaces of landscape images, we want to move our discussion from the plan of the project ECOTOPIA in the actual space of the designed objects, the space of the city, to the plan in which the different equilibria. In order to grasp this second plan, we consider a metaphorical phase space. [fig3]

Could the global morphology of landscape, representing the global equilibria portrait, be affected by an external perturbation? How could one alter landscape equilibria, especially if they define too important

discrepancies between different consumption regimes? The idea is that the introduction of eco-machines as perturbations could modify the socio-eco-morphology of the landscape.

Inspired by the well-known image of Sewall Wright landscape, [7] here the idea is that the hills of the landscape should represent picks of higher or lesser consumption, a quantity that is both a socio and ecological indicator. How external, cyclic, autonomous but interconnected interventions could modify the global form of the landscape?

We use the landscape metaphor, as a heuristic tool, a mental image to help in reasoning. We are trying and look for balance processes in phase space as an approach to conceive an urban system able to actually produce these equilibria. In order to come back to the empiric world, with this hypothesis and questions in mind, and to evaluate the pertinence and the fruitfulness of this approach, at this step of our research we are exploring the field of studies from the territorialist school, [8] to the field of sustainable change researchs for example Babalis. [9] But we are also interested in the approaches that look at the town as a complex system and propose mathematical models and simulations. [10]

Eco-socio morphodynamics produces a modification of the landscape profil. In conclusion, we assume that the post-industrial society would completely enter into a new era of intelligence in decades when green technologies would become prevalent and the eco-agriculture would accomplish totally automatic and efficient production. Furthermore, the urban eco-community would be duplicated and extended constantly to maintain the urban ecology and the natural balance. In particular, the whole ecosystem could come into the virtuous circle.

A structural use of the landscape metaphor, suggests that morphological and morphodynamical aspects of the echo-city could be studied in the phase space, as a global approach to equilibria and changes in equilibria. However, in order to cope with complexity of eco-social system, we think that moving from the traditional hilly surface representing a landscape, to more plastic, morphologically variable objects, could help our future reflection.

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E-PARTICIPATION - ENGAGED PARTICIPATION

Michael Johansson

At the “Collaborative media Lab” participants with a background in academia, design and in art, strated a lab to work with design of new technology and its application with a user-centered perspective in both real, virtual and mixed media settings. We point out the need for a more profound relationship when and where to use digital materials and tools and how to recognize and support participants in different kind of collaborations.



Three design environments - non 3d, michael johansson

At Kristianstad University the informatics group have founded the “Collaborative media Lab” including participants with a background in academia, design and in art. The aim of the lab is to work with design of new technology and its application with a user-centered perspective in both real, virtual and mixed media settings. Having worked with participatory design and 3D/virtual realities in several design/research project, we have seen the strength of collaborative design tools that allow newcomers to design and work with 3D. They were able to engage in designing in relation to rather complex scenarios and spaces, and in that way explore the design challenges that are offered in a particular context. This has typically been done in groups located and working together in the same room. But now with the social web including distributed and shared collaborative environments these setting can be used for engaging participants in a dialogue of future urban design challenges in new ways.

In our former research we gained a lot of knowledge and experience of how to use computers and software as tools when directing and conceptualize traditional productions, but we still have a lot to learn when it comes to seeing digital material as a design or artistic material in itself, especially in the area of collaboration. However it is not so strange, as digital design is not yet as mature as traditional design. Digital material have characteristics that differ a great deal from those with which most people are accustomed. Digital materials are usually more complex and flexible, less transparent and tangible. We have to point out the need for a more profound relationship when and where to use digital materials

and tools. We believe that increased complexity in creative development calls for both disciplinary depth and integrative skills.

E-participation is a way of letting the public into planning and decision processes. The keyword here is “processes”. Rather than e-democracy, e-participation is about creating dialogues, and being able to contribute with new suggestions and ideas. Working in the research field of design, we stress the importance to give the co-creators a common and grounded point of departure, as well as a common surface for interaction, communication and feedback.

We therefore use a mix of fiction and facts in our planning and writing process, to provide relevant and engaging background information. This is later are handed over as scenarios to the invited participants. The scenarios provide detailed and specific data, which then the co-creator can use as reference material for their future action. The scenarios acts very much as constraints, but also as a first generator in a chain of associative design work that follows, producing a shared proposals. Based on scenarios our model of exploration starts in a believably territory, were all of the co-creators put forward, experiment and establishing iterations between the themselves and the scenarios in a collaborative 3d setting. The scenarios. provide knowledge to the different stakeholders and influence their development using this shared 3d environment as the surface for exploring concepts and communicate them amongst the participants in an constant dialogue. A Collaborative 3d environment can be an effective environment for expanding ideas and gain a better understanding of the design task. Totally untrained persons are able to build rather complex spaces within short time limits. It is playful, fun and stimulating to use, promoted innovative thinking and in that way activating the design process. We have worked with similar question in many different projects. In an ongoing art and research project, the city of Abadyl we made these observations, that was descibed in an earlier Paper called Fieldasy.

The role of scenarios in design has been that of writing narrative descriptions of use. Other cultural domains have generated more speculative methods for collaboration. Originating from the idea of autonomous writing the surrealists borrowed methods from academic disciplines such as sociology, anthropology and psychology to elaborate methods in the form of games for exploring the mechanism of imagination and intensifying collaborative experience. They subverted academic modes of inquiry to undermine rationality and invented playful procedures to release collaborative creativity. The role of procedures and systematic strategies, while still being playful makes a creative constraint. Research on creativity points to processes, which not stems from a vacuum in the individual mind, but that they are a result of serious and known strategies. This applies to many aspects of artistic work. Changing a constraint might be at the core of creative thinking. Other researchers stress the process of association, how one item by acts of creative association creates a new item.

The scenarios acted very much as constraints, but also as a first generator in a chain of associative artistic work producing the artefacts.

We use written scenarios. These are handed over to the invited temporary citizens and co-creators. They can then act out the scenario, in and by themselves chosen environment that in the end helped them produce the artifacts. Our scenarios tries to bring field studies and fantasy together, to slowly create a discreate dynamic tension and/or displacement between persons, things, times, places, and events that are not usually - if ever – associated into new and surprising conjunctions. By using scenarios we are able to provide detailed and specific data, which the co-creator can use as background material for their action. Hopefully the co-creator themselves imports qualities into the world, which do not and cannot stem from the City of Abadyl itself.

Example: An interview with one of the participators revealed that; "Imagination was tickled by the knowledge of being part of a networked mapping I didn't know in detail. The scenario got me going, but I felt no repressing obligation towards it and also felt more liberated that in the situations of my own work where I'm the responsible and potential object for critique"

By placing "hard-to-answer questions" in a scenario, where the respondent is not fully in control of or responsible for his or her actions, he or she can eventually take on responsibility for such questions and find ways and means to act out the given problem in a shared environment.

When we are involving participants in complex and/or controversial questions, in a shared dialogues about future issues, it is important not to forget to clearly state what level of influence their participation will have, and process wise, what kind of output, feedback and final result they can expect. Otherwise we will have people playing around with future emerging possibilities with no idea how it will be used or communicated.

Our conclusion is that this is due to the fact that E-participation and the actual design of virtual spaces can support participants and stakeholders to combine different ideas, negotiate and prioritize. In this way the shared environment deepened the understanding of designing in the context of future and complex urban spaces.

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TOWARDS A TAXONOMY OF INTERACTIVITY

STEPHEN JONES

In this paper I take a critical look at the notion of interactivity; an inadequately defined term. It has very deep roots within the world, both as it self-organises and as we construct it. I offer an analysis of interaction based on the notion of “relations” as a general term for the interconnections through which all interactions occur. I examine the degrees of relations that operate so that information flow between entities is enabled.

When one looks critically at a great deal of the contemporary new media art that is described as interactive, one finds a huge variance in its formal manifestations such as

1. the form of the artwork and its technical constructs; *i.e.*, whether it is an installation or a performance, a sculpture or a software application
2. the location and accessibility of the artwork; whether it is standalone or networked, situated in public space or gallery space
3. the kinds of interactors; whether human or machine, audience or individual, or even computer to computer.

These kinds of categories constitute the taxonomy being developed by Katja Kwastek and visualised by Evelyn Munster for Ars Electronica [1] and no doubt others. However this kind of taxonomy does not investigate the actual processes of interaction itself, *i.e.*, it does not explore what happens in terms of the flows of information and signs between entities, human or machinic, when engaged in these kinds of interactions. It is the intention of this paper to develop, in a preliminary form, a taxonomy of the kinds of relations through which information and signs flow in the actual activity of interaction, where relations constitute the connections or linkages between entities.

Interaction – and its co-relative, participation – have a very wide range of structures. Interactive artworks occupy a wide range of levels between the potential fully conversational robot and the video replay that simply switches on when the spectator enters the gallery. These run the gamut from the 'interaction' in the mind of a viewer in their active mental interpretation with an entirely passive artwork (a painting or sculpture) through to detailed and creative conversation between individual people and possibly between people and machines. It is the notion of the conversation that for me constitutes the full concept of an interaction.

In order to come to grips with an understanding of interaction in contemporary art and its range from the entirely one-sided to the fully conversational, I want to assemble an understanding that is as general as possible, so that it is not restricted in its application simply to human-machine interaction, but is operational over the full range of processes that can be described as interactions, be these the exchange of chemical products between micro-biological entities or the possibility of having a truly conversational relationship with a robot in the way that you and I might interact when we are having a conversation. This generality should then allow us to go even further, to the point where we might engineer truly conversational relationships between machines. I use the term 'conversational' because it entails a notion of inventiveness, which we might think of as the capacity to generate new behavioural repertoire and by which we might be able to produce a true artificial or machine intelligence, *i.e.*, a creative machine, one

that can not only trick us into believing that it has passed the Turing Test, but can truly generate new and creative ideas.

Interaction implies reciprocal actions or influences of two (or more) entities upon each other, where an entity is some kind of organised object of multiple components that has some degree of autonomy and agency. Thus, interaction takes place between entities that possess the capacity to act for themselves. It also requires that these actions alter the internal (cognitive) structure of each. At the most basic level interaction is fundamental to life, since it is the means by which an organism deals with and adapts to its environment. [2]

While this paper examines the interaction between an artwork and its spectators, in general the entities that engage in this reciprocal behaviour may be biological, social or machinic. Of the biological, at the lowest possible level of entity are single-celled organisms, at the highest possible level are whole societies or even whole ecosystems, though I will discuss human organisms for the most part. Machinic entities are artificial or constructed, *e.g.*, technical and computer driven installation art, robots, and other forms of potential artificial intelligence. These devices must be, in some sense, adaptive, *i.e.*, able to change their state to accommodate changes in their environment. This is a necessary first condition that has to be possessed by any entity that will undergo interaction.

There seem to be two general terms that apply. One, participation, though not usually thought of as involving relations with some kind of machine or constructed object, may be characterised as one-to-many, and involves engagement with a group of others in an event of some sort. To participate is to place oneself in the context of some process and to engage with whatever it offers that allows some kind of entry into the overall event. One becomes part of some larger thing or event that is the participation, *per se*. These can be happenings, theatrical events, and events in which the spectator has to supply at the very least their presence so as to complete the work. There will be multiple processes of connection developing over time producing a wide spectrum of activities.

The other, interaction, involves engagement with, usually, a single other entity (person or machine), and is commonly one-to-one. Again the work is not complete without the interaction, but here the focus is on reciprocal relationships and their development over time. To interact is usually considered to involve engaging with devices of varying kinds through the exercise of controls or sensors or other data gathering attachments that provide information as to changes in local conditions, and thus permitting the spectator, as user, to participate in the process of some 'thing' so that some kind of reciprocal relationship develops with it.

A distinction is often drawn between participation and interaction. This has an historical basis in that the word participation applied to early (1960s) forms of happenings and other event based art, whereas an interaction is usually thought of as being between a computer-driven or other machinic device and a person. In English usage, one 'participates in' but 'interacts with' some thing. However, in both situations it is the coherence of some larger process – a product of all the entities involved and greater than each entity when each is seen as an individual – that one experiences. As Pask has noted:

“an observer who comes to know the system must be a participant in the system. The boundaries of the system, far from being pre-fabricated, are created by the activities of the system. This is a prescient notion of autopoiesis, or organizational closure.” [3, 353]

The use of the term 'participation' arose in the period of the happenings of Allan Kaprow or, for example, Nam June Paik's *Participation TV* (c.1963). Apart from the obvious person-to-person interaction required in a happening, I suspect that this distinction has lately been drawn through a need for a formal distinction between works produced through the use of analogue systems and works in which the computer is the locus of the choice-point selection process that is seen as interactivity in much recent contemporary art. Thus, participation and interaction can be shown to have a very similar set of characteristics whatever the technological means.

If participation was analogue and interaction is digital then given that they are both means by which one develops some kind of relationship with an other; be they animal, human, significant, analogue or digital machine (computer), environment or any combination of these, then are they not two words for the same thing? The key is that some sort of communication transpires; a reciprocal exchange of (generally 'meaningful') information that endures because of that meaningfulness and its reciprocation. Thus I argue that the separation between participation and interaction is meaningless, artificial, and misdirecting.

But what exactly are the processes of interaction? What are its characteristics? Firstly, whether the process is direct – through the exchange of chemistry (*e.g.*, in biology), or mediated – through language or any of the extensions of our capacities that are embodied as analogue or digital technologies; a body, or some material functional object the states of which are alterable, must be involved. Thus, interaction must be embodied. Interactivity, being medium independent, needs some sort of physical channel through which information transfer can occur. These channels function as relations to the other and could as easily be speech as they could be a camera sensing people walking into the gallery. Ultimately what counts is what is recognised in the sensing and that, like it or not, is analogue.

Interaction is the relational dynamics that occurs between an entity – an organism or device – and its environment.

An organism is any coherent biological entity that metabolises energy in order to maintain that coherence (its organisation) within an environment, to gather and process information about its environment, and to permit its reproduction. At the machinic level are devices that are in some sense adaptive, *i.e.*, that can change their state to accommodate changes in their environment. The need to be adaptive is a necessary first condition that has to be possessed by any entity that will undergo interaction.

An environment is all other organisms and the physical, social, cultural and machinic context that constitutes the experiential space of an organism for any duration. Every thing that is in some sense other to (*i.e.*, not) an organism is its environment. Only the most sterile of environments are entirely passive or neutral; thus interaction and its corollary, adaptability, are necessary for any entity that has to survive in an environment.

To any organism its environment is 'active' when other organisms interact with it by competing with it for resources or by generating outputs (signals) into the environment which may or may not be useful to it. Its capacity to adapt to changes in its environment is essential to its continued coherence and its reproduction. This adaptive capacity is tested by its capacity to use the resources in its DNA, or program, and its stored experience to handle day-to-day changes. But to 'know', in any sense, about those changes it must be able to sense its environment and effect internal changes that accommodate those

sensed external changes. These processes are structurally fundamental to interaction, and they constitute the primary level of the process of communication. [2] Further, they require the two orthogonally related conditions of 'autonomy' and 'agency'.

Autonomy implies that an entity can stand alone in some sense, making decisions based on its own knowledge of its situation. Its etymology is from the Greek *auto* for 'self' and *nomos* for 'law', *i.e.*, self-driven or self-governing and, thus, self-regulating. Based on this we might think of something like a static autonomy, for example an object such as a painting or a sculpture that is complete in itself, through to an active mobile autonomy best represented by a living organism that is capable of moving, feeding, sensing and, overall, making decisions for itself. The notion that a static object, something that just sits there and does nothing is autonomous seems trivial but it stands as the lower bounding case of autonomy. We normally think of autonomy as applying to an entity that is in some sense self-sustaining; that has the capacity to sense its environment, operate on it, and thereby make decisions for itself, and thus we start now to see a merging with the notion of agency.

Agency is that property of an autonomous entity that is its capacity to act in or upon the world. That is, having made a decision it has the capacity to carry out (or execute) that decision.

The kinds of entities that have both autonomy and agency will be both biological (living) and artificial (constructed), *e.g.*, robots and other attempts at artificial intelligence, and our chief interest here, installation artworks.

Adaptation by an entity to its environment both requires and supports its autonomy, allowing the organism to behave independently of other organisms, survive on its own and enact its own decisions. An organism's autonomy requires internal feedback relations in which aspects of its internal system can enact the regulation of its local environment in intentional ways. When these relations spread beyond the organism's boundaries you get social environments in which organisms communicate, sense and have intentionality and from this comes interaction. [4]

There are degrees of relations that may develop when a spectator encounters an artwork. These may manifest in several possible ways.

Degree 0: The artwork may be entirely passive and the only interaction is that process of the interpretation of an artwork that the viewer has to make to be able to see it and render it meaningful to them. Such action takes place entirely within the viewer, and although it is dynamic it has no impact on the artwork, which is itself entirely passive.

Degree 1: It may be triggered to start some playback of a pre-programmed sequence. Obviously interpretation on the part of the spectator is involved, but now the work becomes, in a very limited way, active. However there is no further impact on the artwork beyond the commencement of its pre-programmed trajectory.

Degree 2: It may respond with an action of some sort which will in turn draw further behaviour from the spectator. The artwork can now be said to be interactive. This is the common 'interaction' that occurs when the actions of a spectator elicit some sound, movement, visual or other event from the work that, *crucially*, causes the spectator to make further moves that are sensible to the artwork, thereby elic-

iting different sound or visual events from it. It is the kind of interaction that a musician has with an instrument, and the spectator may in fact be able to develop some skill with the artwork so as to be able to play it like an instrument. However here, the artwork's responses are all preprogrammed in the sense that a particular movement or action will elicit one particular response from the object, or may force a selection from several possible responses depending on, say, a contingent branch in the program flow.

Degree 3: If further movements of similar type are produced, a changing range of responses (*e.g.*, new sounds) may be produced, since, having made one response the machine may then 'know' to make a different, albeit preprogrammed, response when given a similar stimulus.

The above classification is not dissimilar to that of Cornock and Edmonds. [5] For them interactions could be:

1. static: allowing no opportunity for interaction
2. dynamic-passive: change in response to environment, but not influenced by users
3. dynamic-interactive: "generate outputs that correspond directly to input from audiences."

and more recently Edmonds, Turner & Candy's addition of the class: dynamic-interactive (varying): "distinguish[es] articles that change over time, either through automated learning or through updates from the artist." [6]

However they do not go far enough, thus:

Degree 4: By any measure the peak class of interaction is conversation – an ongoing, inherently stable, multi-sided, adaptive process of information transfer, that consists in alternating, reciprocal production and transmission of information and response to that information, through consideration, recognition (of signs), understanding (of their meanings), development or extension of 'ideas' embodied in the messages and the production of further transmissions. Conversation must involve understanding which is a function of a mutually agreed, or learned, set of signs (language) that convey the meaning.

Conversation necessarily involves feedback; the closing of the loop through the response by the second party, which is in turn considered and responded to by the first. Thus a continuing cycle of feedback undergoes temporal development as the conversation continues, and each party is, at least, able to utilise its existing repertoire of behaviours – ranging from language and gesture to the demonstration of objects and processes or the operation of machines. This cybernetic feedback relation, though largely neglected in contemporary art over recent decades, provides a framework of immense value in understanding how interactive systems can work, and it is the circular feedback system that renders the conversation something greater than what exists within each party, such that its coherence gives it a mutually embodied autopoietic presence.

More interestingly, in any intelligent entity (living or artificial) the learning of a set of signs to convey meaning will require the development of new behavioural repertoire through a process of adaptation. The interactive context (the environment) will make demands on each entity and place constraints as to the effectiveness of any behaviours, moulding the development of any new repertoire.

In sum, while none of this is strictly 'new,' little of it has been spelt out and incorporated into contemporary art practice. Pask's work would be the only counter example. Regarding conversation, and paraphrasing him [3, 358–360]:

1. Conversation between individuals occurs over time and alters the mental contents of each individual over that time.
2. Conversations have a start and a finish and unfold over time, although they may run in parallel, supposing more than two individuals are engaged.
3. The conversation is in the union of the minds of the individuals engaged. That is, it exists as a superstructure that is not contained exclusively in either mind but necessarily is a function of the activity of both.
4. There is a process of feedback that gives conversation its unifying character.
5. There is a “transfer of tokens” (language, signs) between each individual within the conversation.
6. These 'tokens' must be mutually understandable. However, the interpretations of the conversation are nevertheless a function of each individual mind.

While many interactive artworks demonstrate some level of “reciprocal production” I know of none that have achieved a truly conversational level of interaction. This I suppose is due to the intractable problems of building a true artificial intelligence. One of the nearest approaches to this status is in Stelarc's work, the *Prosthetic Head*, [7] which has also been the locus of a great deal of work intended to produce various aspects of this capability under the framework of the Thinking Head project. [8]

Finally, I list the component sequences (i.e., the dynamic relations) of the process. What interaction needs is

- A potentially dynamic system in some environment.
- The entry of an interlocutor and a stimulus generated by that interlocutor.
- A response to that first stimulus, functioning itself as a first return stimulus.
- A further response to that first return stimulus followed by a further response on the part of the second party.

This must develop into an ongoing loop of stimulus-response sequences. Ideally it should follow a coherent line of development, and it might stimulate the production of new behavioural repertoire. Thus begins the process of developing a creative machine, in the way that we are creative.

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ENGAGING DYNAMICS

FRANCES JOSEPH

This paper addresses some practical and theoretical issues arising from the development and implementation of a pilot programme of new works for an interactive screen environment sited within a performing arts complex. The notion of performance as embodied practice functioning both as a metaphor and an analytical tool activates a series of social, technological and cultural framings.

This paper addresses some practical and theoretical issues arising from the development and implementation of a pilot programme of new works for an interactive screen environment sited at The Edge Performing Arts Complex at the Aotea Centre in Auckland. The 'Digital Art Live' (DAL) programme is an initiative supported by The Edge in partnership with CoLab Creative Technologies Research Centre, which is based at Auckland University of Technology (AUT).

Struppek (2006) has written about the differences between public and individualised forms of screen display. She has suggested that the zones between virtual and physical public spaces could be used more constructively for 'the creation and exchange of culture and the formation of the public sphere through criticism and reflection.' [1] She recognises that new co-operative relationships are needed to enable new approaches and to challenge conventions. The collaboration between The Edge and CoLab is exploring some of the opportunities and requirements needed to support such cultural exchanges in Auckland, New Zealand.

The location of DAL in the Owens's Foyer of The Aotea Centre outside the ASB Theatre is distinct from urban screens in public squares, from interactive art in gallery spaces and from interactive games that are increasingly found in educational and domestic environments. The environment of The Edge as one of New Zealand's leading performing arts, entertainment and convention facilities, engages many different communities and introduces some particular considerations and opportunities. The notion of performance as meaningful, embodied practice that functions both as a metaphor and an analytical tool, activates a series of distinctive social, technological and cultural framings that the DAL pilot programme has set out to explore and analyse.

Earlier in 2010 The Edge council reallocated some funds earmarked for buying more traditional artworks like painting and sculpture for the theatre foyer for the purchase of interactive screen technology. At a meeting between CoLab and The Edge in mid 2010 the potential of both organisations working together to establish a flexible technology platform and a sustainable exhibition programme of interactive works was recognised. While The Edge management had already made decisions as to the type and configuration of the screen, there were several critical issues that required further consideration. Firstly, the curation of a programme that would not only present new interactive art works, but might relate thematically or formally to the Edge's ongoing performing arts programme including city wide cultural events, such as festivals. Secondly, the development of a content management platform that could support a range of different software and approaches taken by artists. Thirdly, while The Edge was keen to support the development of an ongoing programme, it needed to identify what was required to do this. It was decided to run a year long pilot programme, supported by The Edge, CoLab and AUT, to research, develop, test and evaluate strategies for engagement, content generation, funding and programme organisation of the interactive screen environment. With the screen scheduled for set up in the foyer in

December 2010, an initial test programme to open in February 2011 as part of Auckland Festival was proposed. A more formal programme would be launched in April.

The Digital Art Live interactive screen consists of 12 x 46 inch Samsung thin flat screens organized into a large composite screen. Each screen panel measures 1025mm x 579mm including the bezel. The overall size of the wall is 4100mm x 1737mm. It's a 12 screen display layout, being 4 screens wide by 3 screens high. Each screen has a 16:9 ratio, but the overall ratio of the entire screen is 21.3 x 9, or 2.37 (cinemascope is 2.35 so it is close to this scale). Each screen has a native resolution of 1366 x 768. However the screens can support a splitting system by stretching the image across the entire wall. This means that the overall resolution of the screen is 1366 x 768 pixels. The initial set up included a Logitech HD webcam C510 positioned below the screen. It was agreed that additional sensor and input devices or camera configurations could be considered for incorporation into the system. Subsequently a ceiling mounted camera has been added. While the multiple screen set up presents certain challenges for artists, it has other advantages including the clarity and definition of image, and the opportunity to produce single or multiple screen works. The grid format of the screens echoes the grid in the history of painting.

Inquiries made by CoLab identified iion, an Auckland based company involved in designing an interactive management system. 'Media HD,' which had been developed for the advertising industry. It supports presentation across a wide range of file formats and interactive modes, to provide programme options to ensure continuous delivery and viewer analytics. A basic platform would be provided and additional functionality to support different software and hardware inputs would be added as required, supporting the programme roll out. Processes were put in place to appoint a part-time interactive programme curator. In the meantime, the DAL management group, made up of representatives from CoLab and The Edge, began the programme development.

Three emerging artists were identified and invited to exhibit between mid February and mid March 2011 in a program me titled 'Screenplay at the Edge' as part of the Auckland Fringe Festival. The programme included: 'The Ruru' by Naomi Lamb and The Wanderer Productions; 'Speaking Trees' by Anselm Bradford and 'Magic Garden' by Robert Carter. These three works used very different interactive strategies and presented diverse challenges related in part to the short timeframe, the different levels of experience of the artists in exhibiting interactive content and to the set-up and testing of the Media HD platform. For example one work used a text interface on an iPad. This limited interaction as audience members first read from the iPad rather than experimenting directly with the work. While each work had its own integrity, collectively they did not work as a coherent programme. The Media HD platform functioned well in supporting a range of software applications and hardware devices and the automatic, sequential display of each work (programmed to show for one hour at a time) while also allowing the audience to manually select from the programme. However the Screenplay event presented a number of problems, notably some confusion for the audience in understanding the three different interfaces and interactive strategies of these works. While printed information was provided, it was realised that a simpler strategy, presenting a single work/type of interface in an exhibition would be more effective. It was also recognised that the particular space and configuration of The Edge system would inevitably require some adaptation by iion to support the presentation of new works, particularly if they used software that needed to be added to the system. However a distinction needed to be made between this necessary level of technical adaptation/system development and a more fundamental need to support artists working in other media forms in developing greater understanding and experience working with interactive media. CoLab was in the process of setting up an interactive media suite for teaching and research at AUT. The Media HD system was installed as part of the suite for artists, students and researchers to access for workshops, experimentation and testing of new interactive work.

In April 'Chirp' an original interactive work by Wellington based artist Stewart Foster, was presented at the formal launch the interactive wall. Stewart's work explores real time interactive environments infused with bodily sensations and computer technologies. These hybrid spatial environments explore the limits and interface between physical and digital space: 'We are entering a new realm of digital connectivity where our bodies are extended into digital networked space. The ubiquity of mobile internet connecting devices, electronic displays and social networking spheres all contribute to the rupture from the corporeal body into a constructed digital self.' [2] The work used camera vision and live feeds from twitter. Tweets that included the word 'happy' were automatically harvested and displayed. Motion tracking traced the outline and movement of people moving in the foyer space, plotting a series of blue circular shapes across the screen. The representation of participants in the work was important in that it gave them insight into one of the works interactive strategies. The conceptual impetus of this work and its aesthetic demonstrated Stewart's long-term involvement with interactive media and prior experience in developing large-scale public interactive digital art.

In May curator Nolwenn Hugain-Lacire was appointed to direct the DAL project as a one-year pilot programme. Confirmation of the next two exhibits was set in place, with exhibitions confirmed by Auckland artists Kim Newall and Clinton Watkins. The Edge agreed to an artist's fee for each exhibitor, a policy that the DAL committee saw as fundamental to the longer-term sustainability of the programme. A curatorial strategy was formalised, which included a public call for artist's proposals as well as a summer season of work by students and workshop participants. Supporting the call for proposals, a technical manual for artists was published. The call for proposals invited artists to create work that supported engagement with a public audience through technological experience. It identified a special interest in work that responds to gestural input, supporting performative interaction between the user, the physical space and the onscreen content. It also encouraged works that involve text input, audio, real time or social networking technologies from artists or collectives producing professional creative works. [3]

Planning has also been initiated for a series of workshops to be conducted at the CoLab Interactive Suite in 2011 and over the summer break. It was recognised that emerging artists and those working in other media that they might wish to extended into interactive formats, would be more effectively supported through a workshop programme. The DAL pilot programme will present innovative creative works that were conceptually and technically resolved in order to establish and promote support for a long-term programme. Experimentation and capability development, supported through the CoLab workshop programme is crucial to developing a broader community of practice. A process outline was developed to ensure dialogue between the artist, curator and iion, to be followed by a series of tests of works-in-progress at the Interaction Suite to trouble-shoot any issues ahead of the opening date.

The DAL pilot project is a work-in-progress. Organisationally we are learning through this process. Documentation will soon be available in an online archive on Cola's website. While it is too early to provide a fuller analysis and evaluation of the programme some insights have been gained to date. These include the increasing levels of positive audience feedback and audience response, the formalisation of support provided by The Edge for artists fees and recently from Creative New Zealand for funding to commission new interactive work as part of the DAL programme.

We are currently exploring a number of different strategies including corporate and institutional sponsorship, as well as international cultural programmes to contribute to the ongoing support of the programme. There is potential to commission interactive works for specific cultural events like the New Zealand Readers and Writer's Festival or the Pacifica Festival, which are closely linked to The Edge's ongoing programme. These events present opportunities for the exploration of different performative

modes (for example poetry or dance) and for extending beyond the spatial and conceptual limitations of a 2 dimensional screen into multi-dimensional cultural forms and spaces. The potential for ongoing research into interactive forms, interfaces, curatorial strategies and cultural enterprise, supported through academic funding, is another area that can contribute to the outcomes and value of this initiative. In a small country like New Zealand, a multifaceted approach that builds on institutional collaboration and local networks is essential.

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RELEASING THE GHOST : RELOCATING AN ONLINE EXPERIENCE INTO THE CORPORAL WORLD

Nedine Kachornnamsong

The article is a part of an ongoing research project aimed to transfer and recreate an experience found in online interaction into a spatial setting. By applying the concept of technology appropriation, together with the idea of the ghost in the machine, Yes / No / Maybe (2009) is an interactive art event, a social experimentation, which transferred an online dating experience into the physical world.

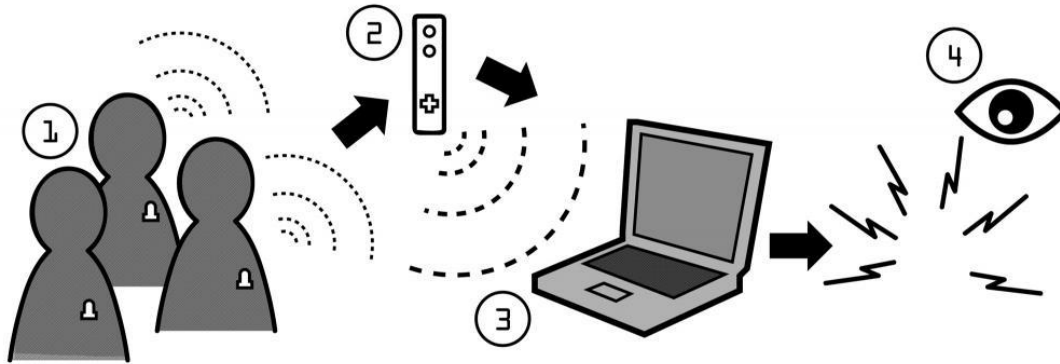


Fig. 1. Yes / No / Maybe: interactive system diagram, Illustration, Copyright: Nedine Kachornnamsong.



Fig. 2. Participants are waiting to be registered into the system, Photo copyright: Helena Bozic.



Fig. 3. The atmosphere of Yes/No/Maybe (2009) event by Nedine Kachornnamsong, Photo copyright: Ljudmila.

After the Essence

Personal computers, mobile phones and closed-circuit television, to name but a few digital devices have become everyday objects. Unlike their mechanical predecessors which utilized motion and kinetic force, these machines excel, mainly, in computing and data processing. They aim not to aid, but to empower. While the older machines are big and clumsy, the ones of the new era are neat and dynamic. Completely encased, clean and static, their capacity is not limited to their functions, but incorporates as well, modes of cybernetic operation which are expansive and abstract.

In the world of digital omnipresence, electronic signals are sent, retrieved and consummated. They respond at the speed of light; a vast network of machines lies invisibly. It is not the speed of the machine but the speed of change that painted the image of our future living with technology. From Mary Shelly's *Frankenstein* to the ongoing *Star Trek* fiction, these popular depictions are based on either utopian or dystopian view. This is an unapt dualistic approach, seeking to interpret the role of technology into good or bad by either ignoring the influence of technology or rejecting our responsibilities towards it. [1] Since our relationship with technology is mutual — we create technology and technology creates us — to engage in such binary classifications, one would need to be as naïve as to uphold the separation of humans and technology.

Enframed by the good and the bad, we see only the two sides of the same coin and not the object as a whole. Perhaps it was Heidegger who first called for a more holistic view of modern technology. He claimed that the only way to critically reclaim technology is to denounce its instrumental aspect and take a look into its essence. [6] As now, the coin is more or less recognized, I would like to further explore its comparative value at use; to reach beyond what technology could be, and instead consider it as a notable source of understanding. This is because technology is our portrait, it projects how we want to appreciate ourselves in the world.

THE USE OF METAPHORS

My first attempt to apply forms of knowledge found in the use of technology was during the site-specific project 'In Place-spective' (2005-2006) in Copenhagen airport, Kastrup, Denmark. Similar to many other airports, it is a space of security, control and standard; a space to go through — always the start but never the destination. Its characteristics of in-between space and homogeneity make up for its lack of meaning and detachment. [4], [5] Even though, a number of theses on 'place', from fields as diverse as philosophy, geography and architecture, were applied to improve our experience at the airport, their solutions are still far from satisfying. After a week of 'quick and dirty' ethnographic research in the transit area, I found the attempt fascinating; trying to redefine a sense of place using influences from another perspective, to find something never been implemented by any airport operators.

I became interested in online communications, where a sense of place exists without the need for physical space. Blogs, web-boards, chat rooms and fora are not only 'spaces' for people to socialize or hang out, they form a complete 'place' when community, attachment and belonging are created among their users. Unlike virtual reality, a cyberspace is primarily constructed through the use of metaphors, instead of the real world mimicry. Graphical User Interface (GUI) is a metaphorical application used to associate visual representation with literary meaning. It involves terms such as desktop, window, page and anchor in order to convey how the elements of the interface and system should be used and navigated, respectively. Another further extension of the metaphor is normally used as an implication, for example, to make understood the purpose and expected activities delivered through the internet portal. [7] This latter type of metaphor such as online market, internet forum, electronic library and (cyber) space, do not refer to physical representations but rather, higher level abstractions — concepts of online space. In other words, we need to establish our own "personal cosmologies" [8] by coupling online possibilities with activities that exist in the real world to be able to fathom the system's uses. [11] Hence, the sense of place we establish within online communications is another strategic ontology imported from the material world to act as a framework for our online interactions. [9] Evidently, without the help of online technology, it would not be possible for us to disassociate the concept of place from the spatial setting.

TECHNOLOGY APPROPRIATION

The difference between an introduction and an appropriation of technology is very well known within the implementation of cybernetic technology. Scientists, engineers and designers may suggest how the technology should work but people are the ones who choose how to use it. Despite the fact that a few people have foreseen the ubiquity of Short Message Service (SMS) or the success of social networking sites, to the virtual reality communities like Second Life, these unexpected receptions of new technology resulting from the meaningful process of 'making use'.

Consequently, the development of any technology depends on both the makers and the users. An example of people unconsciously making place out of virtual space is not simply a coincidence. It is a preference we express, a choice we make through the use of technology. This predisposition will, in turn, reshape the coming creation of technology. And since technology is governed by our determination, it would be unseemly to indicate that it is either unintended, or untrue [3] or reduce it to an accident. [10] And if we are to be more mindful in the fabrication of technology, it is crucial for us to recognize our responsibilities inherent in the role of users.

The Ghost in the Machine

The thought of recognizing ourselves in technology is intriguing especially when it comes to digital applications. These are the machines that have earned the title of being ‘smart’, crossing over between intelligence and physicality. In *A Cyborg Manifesto* (1991), Donna Haraway refers to the disappearing border between humanity and cybernetic machines, which “have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. [2]” In other words, the cyborg problematizes the dualistic concepts that are commonly used to define humanity. Still, the rigid structures in most of societies leave us no alternative but to comply with this dualistic framework.

Even though, from the view of cyborg politics, it seems absurd to engage the division of ‘either and or’ as such, reflected by the *In Place-spective* project, I found that the ghost in the machine approach was invaluable for my thesis of technology appropriation. This is because for every machine, I believe, there is a ghost. And what we are haunted by is nothing but the ghost of our own desire. Only with our will can technology and machines move forward; technology without appropriation is nothing more than an already forgotten memory, which no longer paves our path to the future.

RELOCATING THE GHOST

The idea of integrating technology appropriation came into place in 2008 during a discussion with my then colleague Vadim Dubrov. We were exchanging our views of socialization when I mentioned the concept of a “traffic light” party I had come across a few years earlier. In this particular type of party, organized mostly among college students, the participants are required to dress in one of the traffic light colours which signify their level of dating preference — green is available, red is not available and yellow is undecided. I have never attended one of these parties as such, but I found it is amusing in terms of social interaction. Yet, it is not putting on different coloured clothing that provides traffic light’s attendees any new opportunity. Rather, it is through ‘making a statement’. Since yellow group participants have an ‘unknown’ status — the basic state held by any partygoer — the only group of people who benefit from this are those dressed in red, as they will be less disturbed by the green group which has a better chance with those at the party who are keen to have a date.

This prioritization of the declaration participants’ dating interests found in “traffic light” parties, is similar to online dating. By looking into the structures of dating websites and combining them with the “traffic light” concept, there seemed to be an opportunity to transform an online dating experience into a material setting. Since love and (romantic) relationship is one of the greatest convictions found in human history, this is a challenging opportunity to bring forth such desire — a possibility to bring the ghost back into the world.

FROM THE ONLINE TO THE OFFLINE

To transcribe this particular desire into an everyday setting is to deliver an online dating experience in an offline location. Thus, the different of people’s behaviours from the two settings is needed to be considered in combination with the concept of the traffic light party. There are principles of dating websites which are the keys to delivering the online dating experience that do not apply in the sphere of face-to-

face interaction. Firstly, in order to optimize the search process and increase pairing opportunities, participants need to be able to indicate their level of socializing preference (e.g. just looking, looking for friends, looking for dates, etc.). Secondly, while pursuing their interests, users must have the opportunity to either reveal their personal information or remain anonymous. This possibility for obscurity is what encourages people to become more open and active in their online social interactions. Thirdly, the playful element of online-dating sites represents an informal atmosphere that enhances the socializing opportunities where the users can feel more relaxed and casual.

Nevertheless, declaring a level of dating interest is successful in the online dating because cyberspace is designed for multitasking — one searches in parallel with many others. Thus, it is effective to provide users with an easy way to filter more than one interesting candidate out from the pool of online accounts. It is not only that multi-tasking is rather difficult to do in the real world, but also that such an approach is considered to be unpleasant according to conventional social norms. To succeed in transferring an online dating experience into the material world, the interactions between people have to be more dynamic. Therefore, an interactive installation was chosen as a tool to bring these two domains of interaction in to compliance.

In order to apply the above characteristics of online communication into a physical setting, this project consists of the setup of the event venue and the introduction of a new social environment.

- The venue: the setting and location where the project will take place needs to have a good atmosphere for socialization. A form of social gathering will be arranged and opened to public participation.
- The socialization strategy: the new social situation will be initiated by transferring elements from cyberspace interaction into the physical world. Therefore, the objective is to create an environment in which participants can recognize other people's level of socializing interest while their exact identity remains unknown.

An interactive system will be created as the means to simulate the informative environment that will roughly show participants the level of socializing interest in their surrounding area. Still, this indication shall only represent an average measurement to avoid a 1:1 relationship where the identity of participants and the type of socializing interest can be matched.

Yes/No/Maybe

It is crucial for a participatory project to begin with a period of pilot testing that emphasizes implementing the concepts rather than aiming for an inclusive outcome. While focusing on creating a platform for social experimentation based on the frameworks of internet dating, the main objective of Yes/No/Maybe was to produce knowledge — an analysis of the data collected on the participants' flow and movement — which could be used for further development.

This pilot project was realized during a joint residency program with Ljudmila and MoTa in Ljubljana, Slovenia as an interactive art event. In order to foster an atmosphere conducive for mingling and socialization, it took place in the café area of Moderna galerija, Ljubljana where there was music, DJs and a bar where drinks and refreshment were available for purchase. The registration process was divided into two steps in order to maintain participant anonymity. First, before entering the event, each participant had to specify his/her dating interest for the evening as a 'yes', 'no' or 'maybe' in a paper form. This was

then, folded and exchanged for an electronic tag containing microchips with a unique identification. Afterward, the pairing and registration of dating choices with the tags were carried on by project staff.

TECHNICAL SOLUTION

The technical part of this project was under the supervision of Luka Frelj from Ljudmila. Since it was a pilot project constrained by timeframe and budget, instead of mapping participants' movement using Wi-Fi or long range RDIF technology, a more practical solution was to use IR emitters and Wiimotes for the tracking input. Our ID tag design was inspired by Graffiti Research Lab's Throwies which are small, cheap and aim for temporary use. In each tag, two LR44 batteries powered two IR emitters and an Atmel ATtiny45 micro-controller which was programmed to flash a unique ID signal. Six Wiimotes were hung from the ceiling to cover the whole area and receive the signals sent from the IR emitters in a different time interval. Using the information from the Wiimote sensors, the computer software then mapped the movement of the tags (and the owners) into physical space by changing the LED lights which represented the average value of the socializing level (green, red or yellow) of individuals in that particular area.

THE RECEPTION

The public response to the project was more than we had expected. The event was originally planned to be of moderately sized, but turned into the evening's biggest event. After 40 minutes, all of the 75 ID tags we had prepared were given away. And since Moderna Galerija is a public institution, we could not impose a restriction to stop people from entering the event. At the highest point of the evening, the number of visitors reached an estimated 300 people. While I was astonished by the project's reception, at the same time I understood that it was unfortunate for my research. With only 25 percent of the participants actually connected to the system, the data was inadequate for the analysis. However, if there was any conclusion to be drawn from the event, it would be that the ghost (in the machine) is our desire and the thought of an unrestrained desire had drawn people together that night. In other words, we were all eager to release the ghost from the machine.

Acknowledgements

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DIALOGUES WITH DECAY: TRACING NARRATIVES OF DATA SPACE IN PAT O'NEILL'S "THE DECAY OF FICTION"

Kristy Kang

This paper outlines the formative dialogues that emerged during production of the experimental film *The Decay of Fiction* and its interactive counterpart *Tracing the Decay of Fiction: Encounters with a Film by Pat O'Neill*. The project was a collaboration between filmmaker Pat O'Neill and The Labyrinth Project—a research initiative on database documentary directed by media theorist Marsha Kinder at the University of Southern California.



Installation view of "Tracing the Decay of Fiction: Encounters with a Film by Pat O'Neill" by Pat O'Neill, Rosemary Comella, Kristy H.A. Kang and The Labyrinth Project, DVD-ROM, (Copyright 2002, photo by Kristy H.A. Kang).

In 1993 experimental filmmaker Pat O'Neill was introduced to the Hotel Ambassador. Built in 1921 in the center of Los Angeles' Wilshire corridor, the formerly grand hotel was a famous nightspot that hosted the Oscar award ceremonies and became a magnet for dignitaries and Hollywood luminaries in its heyday. Later made infamous as the site of Robert F. Kennedy's assassination in 1968, the Ambassador closed in 1989 and was left vacant, its abandoned spaces periodically leased as a location for movie shoots. Today the site is home to the Robert F. Kennedy Community Schools. O'Neill was given a tour of its spaces long after its doors were closed to the public and inspired by this urban ruin, he began filming, capturing the way light would move through its surfaces. This collection of shots (captured using a combination of computerized motion control and time-lapse photography) was edited with a temporary soundtrack from noir films and became the basis for O'Neill's 2002 film *The Decay of Fiction*. While working on the film in 1997, O'Neill was invited to collaborate with The Labyrinth Project (a research initiative on interactive narrative at The University of Southern California directed by media theorist Marsha Kinder) on a digital media project that would be based on his film. This collaboration resulted in an interactive DVD-ROM published in 2002 called *Tracing the Decay of Fiction: Encounters*

with a Film by Pat O'Neill. [1] This paper will outline the history of how the digital iteration emerged from O'Neill's film and explore the dialogues that developed while these two forms of *The Decay of Fiction* were being produced.

Since 1963 Pat O'Neill has been creating a body of experimental films that cannot be easily categorized as belonging to any singular strand of cinematic style. His work exhibits an intimate mastery of image processing techniques conventionally used to produce special effects in cinema, but the layered landscape of sound and moving images he composes extends beyond the limited language of traditional effects. [2] Rather than creating seamless optical illusions, O'Neill foregrounds the gaps between his densely layered imagery to orchestrate a different kind of illusion – one of unlimited associations in the mind. A poetics of associative meaning is awakened when watching O'Neill's films and it is this matrix of imagined trajectories that corresponds to one of the characteristics shared in film and digital media discourse – non-linear narrative.

During a workshop hosted by The Labyrinth Project at USC's Annenberg Center for Communication in 1998, media scholars and artists were invited to discuss the possibilities and challenges in creating an interactive non-linear narrative based on *The Decay of Fiction*. O'Neill (who had no prior experience working in digital media) was invited by Marsha Kinder to collaborate on this project because their close friendship created a foundation of mutual respect and trust from which one of the first Labyrinth Projects emerged. Moreover, Kinder had written about O'Neill's work in the 1970s and wanted to collaborate with someone whom she admired and whose work had great potential for interactive database narrative. The goal of the collaboration was to make an interactive work that would be emotionally engaging while both experimenting with and retaining the pleasures of cinematic narrative. Kinder defines narrative "not just as the idea of the well-made story with a three-act structure but...as a cognitive way for contextualizing the meaning of perceptions. It's a combination of data that's selected from a bunch of different databases and put together in interesting ways. And I think Pat's film have that kind of structure." [3] In the computer world this modular architecture of non-linear narrative typically takes shape in the form of a database.

In his book *The Language of New Media*, media theorist Lev Manovich traces the origins of the database to computer science and defines it as "a structured collection of data. The data stored in a database is organized for fast search and retrieval by a computer and therefore, it is anything but a simple collection of items." [4] This idea of data as a "collection of items" corresponds to the way in which O'Neill collects material for his films, identifying himself as "a kind of scavenger that looks through a lot of existing material and finds items that spatially or in terms of feeling have connections to the basic piece." [5] The modes of selection made by the computer or by O'Neill, can be considered non-linear in that items are chosen randomly from a constellation of possibilities. The difference, however, is that computer data exhibits no intrinsic value or associative meaning. The machine does not choose, judge or make cognitive connections between items but reduces them all to identical, sterile bits of information. Although the database evokes a very contemporary notion of computerized consciousness, it connotes a lack of corporeal presence and an absence of the kinds of sensual pleasures found in O'Neill's narratives. Rather than a database that fetishizes computer consciousness, I would like to imagine an embodied *data space* – one that is grounded in human consciousness mapped onto spatial trajectories.

The orchestration of space is central to the narrative trajectory presented in *The Decay of Fiction*. Space takes precedence over action, as opposed to action forming the underlying architecture in most traditional storytelling. The 73-minute film traces a pathway through the decrepit hotel, dripping with the

kind of nostalgic traces that abandoned spaces evoke, a pathway that O'Neill describes as a "choreography for the camera." [6] This feeling of nostalgia is heightened by the superimposition of noir film soundtracks onto the contemporary ruins of the hotel spaces evoking what O'Neill calls "the decay of storytelling or how storytelling merges with the environment or with a space that's foreign to it but somehow attracts it". [7] It is as though these stories are written onto the body of the hotel and watching O'Neill's scenes of sped-up-time, we are witnesses to this decay of fiction.

Conceiving the network of noir inspired action that would take place in the environment occurred after the empty spaces had already been captured on film. Having recorded the camera moves using a customized motion control system, O'Neill was able to later shoot his actors while repeating the same camera movement. Then through the process of optical printing, the foreground action and background spaces would be combined to form a composite image in which black and white figures inhabit a contemporary landscape shot in color. By compositing the present with the collective memories of a vintage era of Hollywood's past the Ambassador's remains become a repository of cultural history and imagined interactions represented in the film by a layer of ghostly fictional characters playing out noir inspired narratives. These narratives are periodically interrupted by animated interludes that seem to emerge from a parallel dimension formed from a repository of surrealistic moments. These parallel spaces converge as the film culminates in a carnival parade of performers whose dance of overlapping bodies blurs the boundaries between past and present. On one level, the film is an imprint of the hotel as artifact – a fossil of the past housing not only the imagined fictions invented by O'Neill but the public and private histories of Los Angeles' memory.

In the DVD-ROM, the hotel's history is an additional dimension that is only hinted upon in the film. In the film, as the camera pans across the hotel's ballroom we are reminded of the Robert Kennedy assassination as we hear excerpts from the speech he gave shortly before his death. Though this is one of the few moments in the film where historical memory materializes, it maintains a peripheral distance to documentary that haunts the edges of the screen. In the DVD-ROM, as the viewer navigates through the ballroom, additional material about the assassination is made accessible through a click of the mouse. This documentary material includes news clippings, archival footage surrounding the shooting, radio broadcasts of conspiracy theories and contemporary interviews with historians and witnesses offering their insights on this historical trauma. These documents are embedded within the surfaces of the navigable space where they remain hidden unless activated. The film de-emphasizes the "artifactual" dimension of the Ambassador hotel as a repository of history and although O'Neill initially struggled to incorporate his historical research of the space into the film script he abandoned his efforts, realizing that he "wasn't doing a documentary but a choreographed camera move with action." [8] Collaborating on the interactive iteration of *The Decay of Fiction* opened up the possibility to include not only historical material O'Neill had intended to include in his film, but additional material researched by Kinder, myself and others during the four year period in which the DVD-ROM and film were being produced. These included moving image archives of social events and publicity stunts hosted at the Ambassador, photographs of the hotel and its surrounding neighborhood from 1920 to 2002 and contemporary audio interviews providing different and sometimes conflicting perspectives on the history of the area. All these alternate layers of narrative possibility exist on the fringes of O'Neill's fictional spaces and can be accessed at any time. While exploring the hotel in the DVD-ROM, one encounters a diversity of data spaces and it is up to the viewer to choose which allegorical vector to follow.

Tracing the Decay of Fiction expands upon the uncanny qualities of place and memory that are present in the linear film by transforming the film's linear spatial trajectory to non-linear spatial navigation or "navigable space" – what Manovich identifies (along with database) as "another key form of new

media.” Although Manovich refers to 3-D computer generated virtual space as a model to illustrate the exploration of navigable space, the same description could be applied to illustrate spatial exploration in *Tracing the Decay of Fiction*. In the hotel, the viewer can activate any of its static interior spaces by placing the cursor over the edges of the screen, animating the still image into motion and following the camera moves that give the illusion of spatial navigation. Near the end of production on the DVD-ROM, Rosemary Comella invited Manovich to view the navigation system she had designed and programmed for the interface allowing the viewer to move within and between the hotel spaces. Manovich discussed his conception of “navigable space” but admitted he had never seen it realized in this particular way.

Another attribute that differentiates the DVD-ROM from the film is its use of “the image as interface.” Manovich states that “The new role of an image as image-interface competes with its older role as representation....a computer image is situated between two opposing poles – an illusionistic window into a fictional universe and a tool for computer control.” [9] The role of the image as both “window” and “tool” is illustrated in the DVD-ROM when the viewer pauses on a still while following a camera move through the hotel. Doorways, walls and windows become links to historical and fictional interludes. However, I hesitate to assert that the use of image as representation and interface are in opposition here. Rather, the immersive beauty of O’Neill’s cinematography is foregrounded and the navigational devices are intentionally integrated to minimally distract the viewer. Furthermore, in the work of experimental filmmakers like O’Neill the image does not always function as “illusionistic window.” Rather, the illusory quality of the image is frequently challenged using the very techniques used to maximize illusion in the special effects industry. While discussing the industrial apparatus that O’Neill re-uses to develop his own aesthetic, he states, “the by-products of the processes of special-effects work....that which undermines the illusion. That seems to be a very powerful thing – the illusion and the denial of the illusion, both present at the same time.” [10] Similarly, the binary poles of image as illusion and instrument are not in competition with each other in *Tracing the Decay of Fiction*, but are “present at the same time”.

Another nodal point of dialogue between the film and DVD-ROM is the differing role that montage plays in each. In the film, the viewer is introduced to O’Neill’s choreographed sequence of narrative spaces – the viewer sees an authored mix and a pathway arranged by its author. In *Tracing*, the viewer *participates* in the mix and editing is replaced by navigation and choice. In the film, a sequence of moving images is arranged over *time* while in the DVD-ROM the moving images are spread out into *space*. The viewer’s choices in that space are arranged into a spatial montage. Spatial montage is made explicit on the DVD-ROM by allowing the viewer/performer to control the “choreography of camera movement” from a selection of rooms in the hotel. By moving the computer mouse over indicators on the edges of the screen the viewer can control specific camera moves or slide into adjacent spaces. Alternately, one can choose a different space by using the original blueprints of the Ambassador’s architect Myron Hunt as a map to locate the spaces to explore on the DVD-ROM. While navigating the camera moves, the ghost-like characters that inhabit these spaces can be activated over the moving image with a click of the mouse. During the production of the DVD-ROM, there was a debate about whether to include the noir characters or to leave the navigable spaces uninhabited in order to retain the uncanny quality of the hotel and invite the viewer’s consciousness to inhabit its spaces. [11] It was a question of how closely the DVD-ROM sequences should mirror the film. While describing the period when he was first filming the Ambassador, O’Neill said, “as you walk around an empty building – especially when you know about who inhabited it and what happened there – you always expect you’re going to run into these people as you go around a corner. I mean its haunted in your own mind...so it was this quality that I was trying to figure out how to synthesize.” [12] While this haunted quality is made explicit in the film’s layering of ghost-like characters, in the DVD-ROM the viewer *can select either option* – either she can explore the empty space or inhabit it with characters from O’Neill’s fiction. Periodically, however, the

choice of combining foreground action and background space is automatically generated whenever an “earthquake” occurs. At these moments, the viewer loses control of the interface and a random collage is generated from the database of foreground and background elements. By alternating the layer of characters off and on or by viewing a randomly generated mix of multiple layers, the emptiness of the hotel takes on a heightened quality of mystery as you realize in your mind, that there is another hidden narrative frequency that haunts these spaces.

In summary, I have outlined the formative dialogues that emerged during the production of *The Decay of Fiction* and its digital hybrid *Tracing the Decay of Fiction*. First I explore the role of non-linear narrative in both projects and show how the complex network of associations created in O’Neill’s films correspond conceptually to the way non-linear narrative is structured in new media. This structuring takes the form of a database, a collection of items, or an index. The indexical nature of O’Neill’s process is reflected in his view that his films are like a journal, a synthesis of disparate units, “a collection of entries all by the same person but at different times and places.” [13] I propose extending the notion of the database to a data space in order to address the role of spatial navigation and spatial montage. Spatial navigation as a mode of organizing narrative footprints resonates in O’Neill’s observation that his films serve as “a record of an individual who wanders the land and from time to time stops to comment on it.” [14] I also explore the dual nature of image both as interface and mode of representation both in the film and DVD-ROM. All of these dialogues converge in the ruins of the Ambassador and in the end the hotel becomes a metaphor for the exploration of data, narrative, memory and history. Finally, it is a tracing of decay that is embodied in the haunted orchestration of spaces written on celluloid and encoded in digital space.

References and Notes:

1. *My role in the DVD-ROM was as co-director along with Pat O’Neill and Rosemary Comella. This involved working on the conceptual development, research and production including the digital compositing, interface and graphic design of the collaborative project.*
2. *It should be noted that longtime collaborator George Lockwood contributed his expertise as sound designer to many of Pat O’Neill’s films.*
3. *Labyrinth Project workshop, USC Annenberg Center for Communication, February 28, 1998.*
4. Lev Manovich, *The Language of New Media* (Cambridge, MA, The MIT Press, 2001), 218.
5. *Labyrinth Project workshop, 1998.*
6. *Ibid.*
7. *Labyrinth Project workshop, 1998. The addition of noir dialogue came through the kinds of signature chance encounters O’Neill welcomes in his work. During early editing, O’Neill was listening to the television when he heard a passage from the noir film “The Big Sleep” and realized that the dialogue fragments had an evocative affinity with the spaces he had shot.*
8. *Labyrinth Project workshop, 1998.*
9. Manovich, 290.
10. David E. James, “An Interview with Pat O’Neill,” *Millennium Film Journal*, nos. 30/31 (Fall 1997).
11. *From a conversation with Rosemary Comella in 2006.*
12. *Labyrinth Project workshop, 1998.*
13. James, “An Interview with Pat O’Neill.”
14. *Ibid.*

THE UMBRAGE PROJECT

Heather Kaplow

Umbrage responds to US media focus on cyberbullying. It is a creative application of frustration-aggression theory to interfaces intended as intermediary steps to live customer service in commercial interactions. The hypothesis is used to look at the recycling of aggression in the mundane activities of capitalist culture and at what individual experiences of frustration might say about where feeling lies within human-machine relationships.

Frustration is one of a small collection of emotional states that is as easily accessible in interaction with technology as it is in interaction with humans.

I am presenting work-in-progress audio and video documentation of several artistic experiments, collectively called "Umbrage", that are being produced and exhibited at various locations in Boston, Massachusetts (USA) between January 14 2011 and January 14, 2012. Each experiment-piece deals in a different way with the experience of frustration in the context of human-machine interaction.

"Umbrage" was conceived by four Massachusetts-based artist-curators (Jed David, The Novotny Collective, Jane Shapiro, and myself) in subtle response to the American media's focus on cyberbullying after a teenager from our region committed suicide on January 14, 2010. [1] Its aim is creative, critical exploration of frustration-aggression theory (Dollard, et al) focusing in particular on the type of digital interfaces that are intended as an intermediary step to live customer service in commercial interactions. [2] The frustration-aggression hypothesis' main principal – that personal experiences of frustration are the direct cause of the kind of targeted aggressive behavior known as scapegoating – is creatively tested and observed within obviously constructed, but still familiar contexts. These works were commissioned out of a desire to talk about the displacement of collective frustration and the recycling of aggression in the mundane activities of capitalist culture, but have begun, halfway through their duration, to offer interesting commentary on what the individual experience of frustration might teach us about human-machine relationships, and where feeling lies within them.

Of particular interest in each of the pieces that I will highlight here are expressions of the tension between dependency on technology and feeling threatened by it. A fundamental manifestation of this tension occurs in circumstances where a computerized interface must be used in order for one to be acknowledged, but must be transcended in order for one to be understood. That such a profoundly human liminal state – being caught between being acknowledged and feeling understood – can be drawn into such sharp focus in automated commercial interactions is at the core of what "Umbrage" addresses, and (I propose,) might be at the 'heart' or 'root' of an improved bond between humans and the technological interfaces that they interact with most commonly.

In the works we are presenting through "Umbrage", each moment of the time between the sensation of acknowledgement and that of feeling understood is broken down and examined as a potential stumbling block on the path to deeper machine-human connection. Each step of the process of automated acknowledgement brings the definition of acknowledgement into question and either lessens the likelihood of being understood by a machine or lessens the likelihood of being understood by another

paper that you are reading now went on for several more pages, continuing with the simulated technical difficulty until it hit the ISEA paper submission character limit. [5]

This subterfuge was created to hide the fact that my presentation about “The Umbrage Project” on the ISEA 2011 panel “Emotion Studies in a Contemporary Art Debate” was not actually going to be a presentation at all, but a performance by the same title.

Here’s the truth. I’ll start at the real beginning:

When I was a child, I was an actress. Not a professional actress, but a local, semi-professional one. I loved it. I was in a number of plays – mostly musical theater productions, but also some dramatic ones, and a television pilot. I did voiceover work, and even one opera. Then, when I was eight, I was in one play that I can’t even remember the name of, and it was my last play: two weeks before the production was to open, the director came to my house and told my mother and I that I was being let go because my personal life was interfering too much with my professional life. Though at the time I could not even quite grasp what that meant, it was the end of a career that I had imagined would carry me well into adulthood. Though I have no idea what my trajectory would have been, I saw many of my friends and peers from that time make it into national television series and movies.

I was very serious about acting. My audition piece was a dramatic monologue (involving a dead cat) by the character Dagmar from the 1945 play “I Remember Mama.” [6] My competitors were usually auditioning with comic-book-like monologues from a Broadway hit at the time called “Annie.” [7] My greatest aspiration in those years was to play the part of deaf-blind activist and author Helen Keller in “The Miracle Worker” and in particular, I wanted to perform a tantrum that the blind-deaf-mute central character has while resisting efforts by her teacher to help her communicate with the outside world. [8] [9]

Most heartbreaking about the end of my acting career was this: the girl who replaced me in the show that I was removed from was noticed by a talent scout during that production and cast in a touring production of “The Miracle Worker.” I believe she went on to play a supporting role in the film production of the musical “Annie” as well... [10]

When I started doing performance art work as an adult, I didn’t see any connection between this work and my childhood acting. I was performing at first to aid visitors in interacting with installed works that I was creating, and then realized that this was also a good strategy for getting people to engage with video works rather than just absorbing them passively. Everything performative that I have been doing has been reactive and site- or context-specific. I did not think of making anything explicitly autobiographical until I got the call for works and papers for the panel at ISEA.

Here is how I responded to it:

“Subject: Emotion Studies in a contemporary art debate at ISEA 2011 in Istanbul

Dear Ms. Rauch,

I am an American performance artist who has been looking for many, many years for the perfect setting in which to throw an enormous, incoherent, uninhibited temper tantrum. I am wondering if doing so might make a perfect fifteen-minute position (one not likely to be taken by anyone else!) summary

within your panel discussion – to be followed, obviously, by discussion with other panelists. What I think I could add to such a discussion is a visceral emotional experience in a context that is designated as intellectual (often read as non-emotional) space – for contrast and simple emphasis.

Thanks for considering the notion...”

And here is how Barbara Rauch, the panel’s chair, responded to my proposal:

“Dear Heather,

Wow, this sounds like a great idea to shake the panel and the audience. I love the idea that people will be empathetic, annoyed etc. Of course we will have to see who else we get and when the right moment for this intervention would be.

I suggest I will be in touch by the end of the week to update you on the panel. Do you have a short bio and a brief statement that we could use? I will send you the format length and more details by the end of the day on Friday.”

This began a series of exchanges between Ms. Rauch and myself about how to do the piece without giving away what I was doing while meeting ISEA’s requirements for bios and abstracts etc. Though I believe that the original tantrum that inspired my proposal raises profound questions about technology and addresses issues of mediation in an oblique way, since the performance was to be surprise, I developed a fictional set of ideas that could tie my behavior at the panel to technology more overtly, without being untrue to the themes of the tantrum in the play and its significance in my life.

Here was my description of the connection between the performance and the fiction in a grant application that I submitted in an effort to get support for the development of the piece and travel to Istanbul:

“I am seeking assistance in support of the development of a performance consisting of a fifteen-minute, double-time (in terms of speed) and double-length (in terms of time) solo re-enactment of a scene from William Gibson’s mid-20th century play “The Miracle Worker”. The famous scene, known as ‘the breakfast scene’, is the beginning stage of a process of breaking down the blind-deaf-mute central character’s disconnection from the world around her via the ‘technology’ of sign language. This scene was chosen, and is being altered or ‘remixed’ for the ISEA technology and emotion panel as a visceral means of demonstrating the tension between wanting to connect and the fear of connection – a tension always echoed in our reactions to frustrating interactions with technology. Because the main character in Gibson’s play is an isolated teenage girl, the piece is also meant to stand in symbolically as a venting of the frustration that bullied Massachusetts teenager Phoebe Prince – a victim of perpetual peer-harassment since immigrating to the US a year before – committed suicide over rather than express to those who might have protected her.”

As the idea evolved, I moved away from trying to mimic the exact gestures from the fight scene in “The Miracle Worker” and began watching children’s tantrums as well as autistic ‘meltdowns’ on YouTube. I worked with vocal and performance coaches in an effort to approximate a tantrum like those on YouTube, without doing harm to my body or vocal cords, in a manner that was somehow more adult than infantile. [11] After months of practice, I came up with something partially improvised and partially

structured, but it took a full fifteen minutes of buildup to get to the peak moments. Here are some of my progress notes from this point in the piece's development:

"Was planning on doing warm up exercises and then trying to choreograph or stage intro possibilities, but instead things devolved pretty quickly into something that could definitely qualify as a genuine tantrum. It was not loud or stormy – feeling too conscious of upsetting the neighbors upstairs so I didn't want to stomp and holler. Instead, it became a kind of sweaty, heavy breathing, rolling around on the ground, squealing, limb shaking kind of thing. There were even a few tears. I don't know what it looked like, but it felt like an adult (rather than a childish) version of tantruming – slower, quieter, but without any kind of reasonableness. Very sad-feeling, but also – maybe because of all of the breathing – very calming or releasing. I'm making a very big effort to keep my face relaxed, but it is hard – muscles for breathing and emotions tense up the face. I don't know if I slipped into it so quickly because I've had an emotionally exhausting last day or so, or because I did something with my body. Didn't feel connected to Miracle Worker or project narrative in any way. Felt more connected to the sights and sounds of my day than to the past..."

And again on a different date:

"Was able to get to the emotional part again pretty quickly this time. Some movement around the room, some rolling on the floor in slow motion, and then I flopped down on my back (getting low and flopping back seems to help) and was easily able to lie there crying and mumbling a bit. But I didn't actually feel sad – just the physical part of sadness somehow. I was saying 'what is wrong with me?' out loud to myself in a way that felt both like part of a breakdown that someone might be trying to stop and like me saying to myself 'what is wrong with me that I would think I should be doing what I'm doing right now in a public venue full of intelligent people who are working and thinking hard about serious things?' Also, did think a little about Helen Keller and acting back then a bit this time. Trying to remember what I really wanted when I wanted to throw that tantrum... Starting to think about Barbara's question about intervention and working some things out with her in advance. I think it might be okay to agree to have her come over to me and try to help if people seem to be getting concerned. I'll just wave her away with 'no!' or 'leave me alone!' or whatever. Also, since I may have trouble keeping track of time, we might want a code for that. Maybe I can ask her to see if she can calm me down by offering me a glass of water when I'm getting close to the time limit or if she feels I need to end things more abruptly. Actually, accepting the water might be a nice natural route out of the situation as well."

Midway through plotting the choreography of the fifteen-minute piece, I heard that the timing of each slot on the panel was being reduced to under ten minutes. I was relieved at first, because less time flailing and fussing sounded easier, but in practice it was actually harder to get into things and gain momentum. I came up with some mechanisms but they did not feel natural and raised new questions.

"Last night when I was practicing, I could not find any logical way to move from the slides to the motion/emotion. Even with motion, I couldn't find any emotion. I couldn't/can't remember my motivations for wanting to do this, and I couldn't/can't find anything to get worked up about...I timed how long it took me to get from trying to launch the slides to a tantrum that felt like it couldn't go any further and it was about 22 minutes. I am likely to have less than 1/2 that amount of time. How do I speed up and/or force the process? I realize also that I will need to be talking at first. So I am working on that. In last night's version, I tried to talk about a first piece I was going to show and about other curators I was supposedly working with and realized I need to make up some fake names etc. I think (if I can feel) I can

break down by trying to talk without working slides, but not if I don't have any content for this prepared! ...I may need to watch tantrums again on line, and also to reread my earliest writing about this/Miracle Worker."

A few days before the paper deadline, I had another Skype call with Barbara, the panel's chair. It began with her decision that it was unethical for me to do this piece without informing the panelists completely (and the audience to a lesser degree) about exactly what I was doing. I explained why I thought this would make things much harder for me, and then she suggested that I don't do the performance at all (or maybe only do a sample snippet of it) but instead have a five to seven minute dialogue with her about the development of the idea and how she got nervous about it at the last minute. Her idea was that this discussion would inject emotion into the panel as much as a performance would without making people feel tricked or criticized in some way.

Here are my notes from after that conversation:

"I feel like crying. I just got off the Skype with Barbara, and it sounds now like she doesn't want me to perform. No, that's not it—she wants me to perform, but not to throw a tantrum. No, that's not it. She wants me to talk in dialogue with her about not performing, and maybe to demonstrate a little bit of what I would have done if I had performed. She is frightened of distressing the other panelists/breaking the panel's trust, and wanted to let them in on what I would be doing as well as to warn the audience. When I expressed my concern about how I was relying on the tension of their expectations of normalcy to create a breakdown in such a short amount of time, and explained how I was no longer planning on flailing/kicking/screaming but just to lose my emotional grip. I tried to talk her out of telling them, but her fear is losing the trust that needs to be built for a successful, open discussion.

I actually am crying! It feels like the disappointment of my childhood all over again. Like being asked to leave the play again right before opening night. Why am I going so far if I'm not going to be performing? I don't think I've ever spent so much time or energy or money on anything or taken as much risk in my life as I have in preparing for this and it was because I felt I was uncovering a path from my past which seemed like it could take me someplace far more interesting than I could have imagined it would back then. Now I have no idea what I am doing. But I do know I have to write a REAL paper for it by Saturday...

Between now and the last time I wrote, I came up with a little bit of a setup, a prop that made more sense than a slide clicker, a dynamic (trying and failing to speak from memory rather than using slides) for breakdown that felt more naturalistic, and names/some simple dialogue to get started with. Maybe I can still do some of it in reaction to the dialogue with Barbara. I think she doesn't want to take responsibility for my behavior, but maybe I can still do whatever I want as long as I am the scapegoat?"

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FROM IMAGE TO IMAGO - FLORA'S & FAUNA'S ARRIVALS AND DEPARTURES

Katerina Karoussos

This paper analyses the conceptual media of late antiquity which have built the entire imaginative sphere of the time and seem to be profound and flexible enough to meet the recent imagery strategies. Antiquity images are comprised of elements that have been chosen for the sake of their significations, as data of mutation not necessarily characterized by their aesthetic values but rather as aggregate spaces which could serve telematic mechanisms.



Fig.1. 'La Primavera', Botticelli (1445-1510) Galleria degli Uffizi (Creative Commons license)
<http://www.arteyfotografia.com.ar/1397/fotos/9259/>



Fig.2. Polygnotan Vase 430 BC. License by Creative Commons.
<http://www.flickr.com/photos/peterjr1961/5168147253/sizes/z/in/photostream/>



Fig.3. 'Laocöon' Royalty Free Stock Photos http://www.123rf.com/photo_590906_the-statue-of-laocöon-and-his-sons-also-called-the-laocöon-group-is-a-monumental-marble-sculpture-no.html

From Image to Imago - Flora's & Fauna's arrivals and departures

Visual Tendencies

In *De pictura* (1435), Leon Battista Alberti famously initiated to consider the frame of the painting as an open window. Alberti's single-point perspective has been, for most of the twentieth century, the dominant form of the image. Imagery has been operated as a single image in a single frame. However as Joseph Masheck points out "Alberti's window shares a larger problem of the so-called postmodern culture that deserves to be faced; hence the failure of postmodernism to defend its claims to the culture of the past, resulting in its closure and containment as just another movement". (Masheck, 1991).

The most important thing concerning this failure is the interpretation of things and phenomena according to terms of length, width and high, using Cartesian coordinates with one vanishing point as view-point. Consequently, as the development of technology and science required a more extensive vision for interaction and immersion, the concept of image, as it has been established by Renaissance and Enlightenment, has been proved inadequate. Actually, from pre-historical period up to Renaissance there is a completely different approach of visual aspects and even though it was inherited and implemented during 16th to 20th centuries, it was subject to persecution, being regarded as inferior to Modernity's brand new ideas.

However, with this narrow, one perspective, vision it is very difficult to understand the words of Chloris, the Nymph and mythological figure who said, while her lips breathe spring roses:

'I was Chloris who I am now called Flora'. (Ovid, 8th c BC)

Chloris, as a mythological figure presents the uprising of spring thus the celebration of life against the death. Did Ovid wrote a tender poem while Chloris in her description said that she was raped by Zephyrus? She said:

'It was spring, I wandered; Zephyrus saw me, I left. He pursues, I run: he was stronger; and Boreas gave his brother full rights of rape by robbing Erechtheus' house of its prize. But he makes good the rape and I have no complains about my marriage'. (Ovid, 8th c BC)

In Botticelli's "Primavera" one can see the scary face of Chloris as Zephyrus trying to grab her. Even if he extent his arms in a polite way as if he wants to embrace her, his face and his chest assure that he will going to catch her up as she was his victim. From the other side the ghostlike figure of Chloris testifies the impending rape. So Ovid's poem said that a girl was raped and a house was robbed. Is this a manifestation of life? Is Chloris a symbol of revival and joy just because she is surrounding by flora? In the same view, is Duchamp's urinal also corresponding to a source of life because is called fountain? (fig.1) Accordingly, we can say that frescoes in Lascaux caves are a celebration of nature, since they depicting fauna and flora. The evidence suggests that there were not merely decorations but codes of communication with others, humans and spirits. Additionally, those who create Nazca geoglyphs in Peru they were thinking of just a decoration that is visible from the sky? Undoubtedly the purpose of these designs related to astronomy and cosmology but with a perspective which is different from our common spatiotemporal interpretations.

Aggregate space

Images – which includes fauna and flora and by fauna I include the human genre - comprised of elements that have been chosen for the sake of their significations, as codes of something not necessarily implied of their effect as works of art, or arrangements of forms and colors. They devised from different aspects than that which is termed aesthetic.

In his Treachery of Images, Rene Magritte was more accurate from Botticelli's Primavera. He said: "This is not a pipe". This is something absolutely true. It is not a pipe; it is an image of a pipe. It does not "satisfy emotionally" - when Magritte once was asked about this image, he replied that "of course it was not a pipe, just try to fill it with tobacco" (Spitz, 1994). Indeed, this pipe which is not a pipe has been traversed from its physical status to the sphere of a form or a figure. In a quick historical review one can meet the elements of an image as codes of signification.

As a matter of fact Hegel and Derrida referred to Natural Religious Consciousness thus the first stirrings of religiosity within the minds which saw Nature as God, or as a series of gods. There are today many religions which still insist upon a minimum reverence to certain animals and/or elements in their rites. He spoke about flower religion as a neutral state of unification. And this is what these images depict.

'The state, in which spirit sees itself outside, apprehends itself as its own proper object in a natural and immediate figure. The spirit looses itself and finds itself again in these external natural objects.' (Derrida, 1990)

From the standpoint of this concept all things known to us—men, plants, animals, planets—are unstable, and they differ by the magnitude of their fluxions. But the thing, changing continuously in time, sometimes very much, and quickly, as in the case of a living body for example, still remains one and the same. The body of a man in youth, and the body of a man in senility, these are one and the same, though we know that in the old body there is not one atom left that was in the young one.

The image of invisible in antiquity was succeeded throughout noetic rather than esthetic perceptions. The image space was an aggregate one, not following a systematic order; this of a coordinate system. The aggregate space that Panofsky points out is this stage that all elements (figures, landscapes, motifs, etc) are in juxtaposition as consecutive signs.

One can meet this kind of space in archaic reliefs such as the horsemen of Parthenon. In this frieze there are sixty riders arranged in ten ranks. Each rank is marked by a figure placed nearest the observer and not overlapped by another. It is important to mention that the original word translated in English as

“frieze” is “zoforos” meaning something that brings and/or carries life. Thus, it is about energy and flow. This of course refers to the entire image and not a piece of it. You cannot extract an object as a central issue because aggregate space requires an overall visual syntax, as a signifying composition on several levels. This is something similar to emergence as a spontaneous organization in which every element involving into it maintains its object orientation while it is a part of a unit.

Parthenon frieze was a very good field research for Aristotle who in his “Metaphysics” claimed that the whole is more than the sum of its parts. This concept formed the idea of Holism (from ὅλος holos, a Greek word meaning all, whole, entire, total) meaning that all the properties of a given system (physical, biological, chemical, social, economic, mental, linguistic, etc.) cannot be determined or explained by its component parts alone. Instead, the system as a whole determines in an important way how the parts behave.

In his book “Perspective as Symbolic Form” Panofsky said that:

'...the art of classical antiquity the objects were not merged in painterly fashion into spatial unity, but rather were affixed to each other in a kind of tectonic or plastic cluster ...space was still perceived not as something that could embrace and dissolve the opposition between bodies and nonbodies, but only as that which remains, so to speak between the bodies. Bodies and the gaps between them were only differentiations or modifications of a continuum of a higher order. The represented space remains an aggregate space; it never becomes that which modernity demands and realizes a systematic space.' (Panofsky 1997)

The idea of this space is similar to the concept of a “stage”; or better to both its concepts, thus both of noetic layers in phases and of the stage as an area of performing. It is what Panofsky called: the lateral staggering; thus the disposal of all elements and their energy in a single unity no matter their position in time and space. Dickson’s film with Sioux natives produced in Edison’s Black Maria Studio, shows an organic movement of objects grouped together to suggest a unity of a single body. The idea goes back to ancient Greek drama and the chorus. The Greek chorus (or chorea) is a group of performers which are acting in one piece. The group comprised of twelve or fifteen members in tragedies and twenty-four members in comedies. They operate as intermediates in unison, in specific key frames into the play that considered of high importance.

The very same structure was used in visual arts. An important example is the Polygnotan vases. (fig.2). Here we can see the horses in a real time staggering;

'... all the body of the horse is presented in a single image, the rear elevation is placed alongside the front elevation, just as when entire figures are staggered.' (Panofsky 1997).

And in this united stage objects and figures operate in the same exact matter. Having a better look at those horses and bringing back in mind the Parthenon Frieze, one can indicate a kind of time- sequence and a notion of motion which is embodied in them as there is an inner principle that animated them.

In his contemplation on the Laocoon, Goethe states:

'To seize well attention of the Laocoon, let us place ourselves before the groupe with our eyes shut, and the necessary distance; let us open and shut them alternately and we shall see all the marble in motion; we shall be afraid to find the groupe changed when we open our eyes again'. This flicker effect that Goethe suggests is actually the mechanism of all the above images. Even if an image is one instant frame or a multiple of frames, they both comprised a mutable unity.

But is this a time sequence animation? It is more about a trace or a path rather than a structure of linear time sequence. This is something that can be easily understood through the stereoscopic analysis of movement by Etienne – Jules Marey.

'Marey though it necessary to reconstruct movement by making its physical wrapping abstract, based on a combination of visual formulas that do not prepose figurability, but on the contrary condition it.' (Micheaud, 2004)

Furthermore one can meet the whole concept in Duchamp's "The Nude Descending a staircase" (1912). Duchamp choosed to depict the motion of his nude in a single frame in order to posed the idea that time can be frieze for the sake of an augmented image. Therefore if the stage is one and only –as the single horizontal line of Polygnotan vase- and the objects into it are all in one unfolded, there is no need of change or movement. In this energetic space the venture is that of the appearance and disappearance of scene's elements, just like the flicker effect of Goethe's description for Laocon's statue; hence the effort to demonstrate its exclusion of physical appearance and its modification to an abstract form. So we can say that Flora who was once Chloris had traversed herself throughout her modification, rather than changed herself. What we see in the stage is her path, her trace and not her portrait. The path, which is many time unsuccessfully interpret as serial movement, reflects the three stages that Hegel and Derrida raise in order to construct a unification.

'The concept of religion fills itself up, determines itself in opposing itself to itself, then reconciles itself with itself; in three moments that fulfill the absolute spirit. In the first moment, absolute spirit finds its existence in religion, but in a religion whose concept yet remains empty indeterminate. The second moment is that of natural religion which the spirit looses itself and finds itself again in these external natural objects.' (Derrida, 1990)

Media Res

The flower is neither an object nor a subject, neither a not I not an I, among all these opposites, the essence of the flower appears in its disappearance as a neutral stage. This absolute time of modification is depicted in all the above images and it is similar to the archaic concept of "in media-res".

In media res or media in res means to be into the middle of things is a Latin phrase concerning a narrative technique in which the story begins most of the times in the mid-point in where there is the most critical point of the narrative. In the house of Dioscouri at Pompeii there were two significant frescoes that one can see them now at the National Museum in Naples. The first one depicts Laocoon and the second one portrays Media. (fig.3) .We know from the narratives that both characters were in a very bad position the very moment of their depiction. Laocoon is dying from the snake's bite and Media is going to kill her children after a second. Each image has capture a moment in media res in which all phenomena whose nature is suddenly to break out, disappear and appear again in another mental stage, presented as unified in an unconditional and unchanging duration. Media stands to the right of the composition, frozen forever rather too "posed" to be natural. Their condition reflects the theory of flower religion which is followed by that of sun religion. The latest concerns the stage in which "the sun does not set, or it sets immediately", like Goethe's flicker effect. Hegel placed this procedure in natural religion in where the sun is not yet a subject. 'In order to become a subject in effect' he said that 'the sun must go down.' But Zarathustra, Laocoon, Media, Chloris and all the other elements that had been mentioned before, stand beyond the route that Derrida called: from orient to occident with its double meaning, that is they are in a media res stage in where orient and occident is included, birth and death, east and west, male and female and all other opposite doubles, with no reference in vector magnitude in their spatiotemporal circumstances. One can assign meaning to Chloris' words: 'I was Chloris who I am now called Flora' by replacing the concept of image with the concept of imago.

Conclusion

In biology, the imago is the last stage of development of an insect, after the last ecdysis of an incomplete metamorphosis, or after emergence from the pupa where the metamorphosis is complete. As this is the only stage during which the insect is sexually mature and, if it is a winged species, has functional wings. In conclusion, in a neutral time all elements in an image reached their pick, performing in a gestalt effect while their depiction is of their absence rather than that of their re-presentation. What is to be shown, is the traces of their appearance and disappearance throughout an organic process of their unified mutation.

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RE-MAPPING THE CITY IN THE DIGITAL AGE

Eva Kekou

The way we live and feel about the city is beginning to be affected by its information layer. Locative and mobile media can be regarded as an interface between the digital domain and the physical city. I investigate through media art case-studies the questions: How do people deal with this relationship between digital technologies and the city? How are cultural identities expressed through these projects?

Introduction

The way we live and feel about the city is beginning to be profoundly affected by its information layer. Today's cities are no longer limited to the experience of physical spaces. Cities are now characterised as 'Cybercities', 'Sentient or Hybrid Cities'. The digitization of the city, with technologies embedded into its streets and buildings and carried by people, has appended an informational membrane, which hovers over the urban fabric" [1].

We are seeing a change to the city where understanding its new behaviours and its interfaces is becoming as important as understanding its physical geography. The city's connectivity and networks now comprise the interaction between its wireless infrastructure, mobile phones, social software and embedded systems. Locative and mobile media can be regarded as an interface between the evanescent digital domain and the physical city, sending data from real world experiences back into the digital domain.

New communication technology and space

Social life in the 21st century is increasingly lived in media cities. During the last thirty years, the evolution of technology has added a new layer to the urban environment, challenging classical theories of urbanism and adapting it to the current ideas of the media. We can regard the contemporary city as a media-architecture complex, which has resulted from the proliferation of spatialised media platforms. While this process has existed at least since the development of technological images (in the context of urban modernization in the mid-19th century), its full implications are only coming to the fore with the expansion of digital networks. The term 'media city' is "designed to foreground the role of media technologies in the dynamic production of contemporary urban space in Lefebvre's sense of binding affect and cognition to space" [2].

The way we experience cities is shaped by the immaterial city of word, image and myth. It is through these that we learn not only to perceive cities, but also how to live in them. Today we speak of cyberspace and cybercity, which is more than a single integrated and ubiquitous entity revolving around the Internet. New technologies have revolutionized the way we communicate, interact, transport information and finally the ways in which we express ourselves. New technologies and new communication tools have the capacity to create new space for people to meet, interact and exchange ideas in what Habermas calls a "public sphere" [3]. Wireless communication technologies have also created new circumstances for 'locus' and 'time' and laid the groundwork for virtual time and place.

Urban life and society are related and narrated as artefacts, social problems, critical discourses in every era are reflected in society's artistic expressions. Such expressions reflect the way people live and are able to speak out, not only about themselves as individuals, but as a collective, through a number of public art and interactive media art projects. The new communication technologies have revolutionized the way people interact with each other and how information is transported. This is a result of a long process produced by innovation in telecommunication processes and other information technologies. The growing use of telecommunication systems is not only having far more influence on where people work and live, but is changing the character of activities that take place in the home, workplace and transportation. The diffusion of information technologies increases the complexity of cities by increasing both the number and type of interactions between individuals, firms, technical systems, and the external environment [4].

Most observers believe that technology will eliminate the need for cities as centres for interaction. The leading media guru, Negroponte has stated that the post-information age will remove the limitations of geography [5]. Digital living will reduce dependence on being in a specific place at a specific time, and the transmission of place itself will start to become possible [6]. While telecommunications technologies are certainly space-adjusting phenomena, the emergence of the internet, the growth of mobile telephony, and the diffusion of new information technologies are doing far more than rearranging the spatial pattern of activities in cities and metropolitan regions. New telecommunications systems redefine the fundamental elements of modern urban societies.

New technologies that are introduced every few months, reflect society's tendency towards globalisation. Services like Google Earth, Geographical Positioning Systems (GPS) and user friendly internet based Geographical Information Systems are widely used, making the most out of the wireless and mobile networks that exist in the cities. These are all ways of recording and imprinting our perception of space. The word geography has Greek roots. It comes from *gaia*: earth and *grafo*: write. These meanings have changed, together with our definition of geography. The term 'mapping' has changed with the notion of geography and the advances of technology. The geographical expression is entwined with its digitalized character.

Architecture and mapping are not only what is built. They are made of different aspects: material and immaterial. Architect Benedikt [7] saw cyberspace as the realization of ancient dreams of overcoming the impediments of matter. The design of cyberspace is the design of another life-world, a parallel universe, offering the intoxicating prospect of fulfilling - within a technology very recently achieved - a dream thousands of years old: the dream of transcending the physical world [8]. Novak shared a similar dream, arguing that the source of fascination with cyberspace is the promise of control over the world by the power of the will. In other words, it is the "ancient dream of magic, which finally nears awakening into some kind of reality" [9]. For Novak the sublime magic of cyberspace was characterized not so much by a loss of the body, but by an embodiment of the mind. But the body would be transfigured; not only without organs, but seemingly without limits. The rise of cybernetics coincided with a fundamental shift in urban thinking.

As Kittler points out, "the invisible city, with which Mumford concludes his world history as the history of the city, consists of more than mere information technologies operating seamlessly and at the speed of the light" [10]. New technologies, the hybrid conditions between virtual and physical, and electronics embedded into physical environments have also been considered as "non-material elements of architecture" [11]. The debate now is about how architects should respond and design within the contemporary

world, where space is constituted equally by conventional, material means, wireless networks and gadgets of new-technology. Taking further the notion of compression of space and time as introduced by Harvey, we speak of compression of work capabilities by the notion of cloud computing, which allows access to one's work from multiple geographical locations [12].

Aims and objectives

For the purposes of this paper, I have chosen projects to highlight digital mapping as developed through new communication technologies.

1. Athens by Sound

In order to highlight the idea of mapping the city in a multi-media digital era, I will use the project *Athens by Sound* [13], which was the National Participation of Greece in the 2008 Venice Biennale of Architecture. The project focused on mapping the city of Athens through the sounds everyday life created within it. The sounds we hear – but hardly ever listen to – can present the world around us as clearly as our vision. That is how people with visual disabilities understand and navigate normally in the city. We are just used to regarding vision as the dominant sense. The team of Greek architects responsible for the *Athens by Sound* project tried to focus on the aural impressions the city leaves on the visitor, by recording its sounds and presenting them to the visitors of the Greek Pavilion. They designed the dimly-lit space of the pavilion like a forest of hanging headphones, which transmitted the sounds of Athens. As the visitor walked amongst them, he could put on whichever headphone he liked, without knowing in advance what he might hear. What he actually heard was a sonic fragment of the city, revealing aspects of its identity and atmosphere. The whole space of the installation in the pavilion was treated like an interactive sonic map of Athens; a map that allowed visitors to explore qualities and fragments of the city step-by-step, instead of offering the usual all-encompassing overview offered by the traditional way of mapping. The map attempted to capture the sense of the unexpected and the surprising of the actual city and incorporate it in the installation as part of the navigation process.

How do people deal with this emerging relationship between digital technologies and the city?

Omonia square, a focal point of the physical formation of Athens, was placed in the centre of a 10x10 grid, drawn up for the mapping process, that was stretched across the whole city until it touched upon its limits that were dictated by the natural environment (the sea and the hills that surround the city). It was a way of defining one hundred urban spots, whose geographical coordinates were then imported to a GPS system and assigned spatial and temporal coordinates, from east to west. The spatial distances were one and a half kilometres between the spots and were transcribed to one and a half hours on a scale of time. Each horizontal line of the grid was scanned and recorded from east to west within one day. When these recordings were presented in the installation, the visitor was able to trace the city, following random routes. Fifty sounds were chosen for the headphones of the exhibition and other sounds were transcribed and written in words on the corresponding spot on the floor. The visitor was expected to read them on the ground and reproduce them mentally. As in the actual city, movements, events and the complexities of the human presence were elements that constituted significant spatial qualities within the built environment, abstractly represented as the labyrinth of cables and screens. These kinds of functions and movements are what ultimately constitutes urban space. In the attempt to negotiate the non-representable presences of the urban space in a map, the installation was forming an urban space, as Lefebvre would probably argue.

The space was designed to be interactive:, with the presence and movement of the visitor activating the sounds and images in the installation. The installation included also twenty-five scattered prisms with video-screens that were activated by human presence. When the visitor got close to one of the screens, it automatically turned on and played video and sound. The videos were shot and directed in a way that referred to regions of Athens through sound, without aiming at a visual representation of its distinct architectural or physical characteristics. The random activation of videos and sounds within the interactive environment of the pavilion space produced in turn multiple sonic qualities, intensities, layerings and densities, creating the identity of this unique space and its dynamic relationship with the people. The visitor, like the inhabitant of the city, was responsible for the sonic environment constituted by his own actions and trajectories within the installation space. "The sonic environment of Athens is ultimately the outcome of a certain urban culture, the carrier of which is the visitor himself, each one of us, out there" was stressed by the team [14].

The investigation of *Athens by Sound* attempted to deal with the broader issue of space beyond the material in various way: in reference to the sensuous and senses beyond the visual; in reference to new technologies as parts of our everyday urban environment and as representational tools that open up previously unforeseen possibilities for mapping; in reference to human interaction within a space; and in reference to the non-representable aspects of urban space. Within our own relationships with the sounds of the city we inhabit, we can focus on our immediate perceptions of our sonic environment; we can isolate ourselves in our own sound tracks through headphones; we can have the sonic experience of what is here and also of what is there. We can consciously turn down the intensity of the sound of the environment and focus on our own inner thoughts, or on something that is spatially displaced. The unique perspective of *Athens by Sound* presents the city as a fragmented constructed space, a hybrid of electronically mediated and real spaces.

2. Coffee deposits: topologies of chance

Coffee reading is an old art of fortune telling which takes on a new twist today with the ingenious use of digital technology, as it is expressed in Bastajian's "coffee deposits, topologies of chance" project, available for view on DVD [15]. The team created small mobile coffee reading places where people could visit and have their fortunes read off of a cup of coffee. Fortune telling, however, propagates various impressions among people, some of them quite negative, leading to an unofficial notion that it is either sinful or illicit. The locations of the mobile coffee reading places followed a predesignated route and used GPS coordinates so that they might be easily attended. The result of this project was a map of the coffee reading locations that can be detected by the network community and a digital documentation of coffee readings accompanied by the people's stories. "Currently Bastajian and Manavoglu are developing locative «post-scripts» via QR codes, geocaching and AR tacticts that expand the archive of Topologies of chance into public space" [16].

The old and superstitious art of fortune telling that evokes and is itself a sort of storytelling translates the space where it is performed into a mixture of emotional, ludic and topological locus. The presentation of the project through the use of an interactive DVD disk only enhances it as a documentary, proving that a combination of narrations can be viewed in various sequences for a different experience each time. In other ways a cinematic arises with interactions and new narrations according to the choices of the viewers. A game of uncovering secrets and documenting emotions that in the end ascertains the atmosphere of the space, "coffee deposits, topologies of chance" is a mapping method of human mentality in all its spectrum, employing traditional, mystical and esoteric practices which all imply a new type of cultural identity bound to traditional elements framed in a globalised digital culture [17].

3. Urban Digital Narratives [18]

This was a locative mobile artwork in street locations in central Athens created in the spring of 2011. The locative project was part of a workshop conducted by Rieser and Kekou in an inner city street where personal stories were constructed and developed by volunteers using *Empedia* [19] software to form trails triggered by GPS or QR codes. Video scenes or vignettes, based on documentary experiences of place and the communities in central Athens, were fleetingly revealed at different positions in the chosen streets by the scanning of QR codes. The video stories for display on mobile phones in the actual streets were created in a public engagement workshop in the city.

How are cultural identities expressed through these projects?

Digital Urban Narratives sought to address the powerless and the disempowered and attempted to map their stories, problems and trajectories onto the urban space of inner Athens using simple QR and GPS technologies, to give the widest readership for those with either smartphones or middle-range mobiles. The chosen area of Gazi-Keramikos was a very mixed inner city area, where gentrification had created a pleasure zone of clubs and cafes surrounded by established artisan communities and migrant communities to the North. These disparate elements faced multiple problems, above all a sense of powerlessness in the face of the ill-formed status for recent migrants and of displacement by rising property prices and rents in the south of the area, together with an influx of noisy and youthful revellers with hedonistic values into conservative working neighbourhoods. "After the Olympic games and given the absence of a program or plan to answer the pressing issues of a Mediterranean metropolis in transformation, the centre was almost abandoned to its fate. As a result, for many years, the city has resembled a ship tossed helplessly on stormy seas. As central Athens grew in the characteristic manner of a disordered Mediterranean city, the market forces privileged the creation of entertainment zones and we saw phenomena of arbitrary and ruthless commercialization by unrestrained private developers, instead of the creation of well-planned residential areas for the middle classes. The displacement of local inhabitants appeared as a clear trend, but in the long run it did not prove particularly advantageous for the upper middle class and their aspirations; instead, it created profits for short-term speculators and especially, the owners of nightspots and black economy enterprises" [20].

Multiple and complex narratives were recorded in audio-visual forms from all the disparate social groups. "Above all, immigration has played a determining role in the transformation of the city centre. Initially, internal migrants arrived looking for shelter and set up their coffee shops, groceries and associations. They gathered in and around Omonoia Square, met their kin and with other members of their social group to subsequently disperse around the city. After 1990, there are new arrivals. These are displaced urban nomads who had been moving around in emergency conditions. They start arriving from different locations. Due to its geography, the city of Athens was to become one of the main entrances of migrants directed towards Europe. Again we see the creation of gathering places, coffee shops and groceries, restaurants, Internet points and phone call centres. There is still no official reception policy for immigrants and asylum seekers. All they are faced with is a system of brutal arbitrariness" [20].

It is not surprising that Athens has become the focus of resistance to the imposition of draconian neo-liberal disciplines on its economy and that it remains the flashpoint for any future European economic crisis and the space where the contradictions of the market and its effects on the contemporary city appear in their acutest form. The uses of digital technology can highlight, augment and interpret these contradictions, giving voice to the dispossessed but their solution remains a political one. Urban digital

narrative has been an artistic project which was not meant to be but has been developed to be a political one, although artist ,curator and participants all got apolitically involved.

Conclusion

New media have the potential to express personal ideas and emotions about the city and map them onto the spaces that inspired them for further public consumption. They can simultaneously remap the city and give another dimension of understanding to it. New technologies can make users/participants both interact with the piece and express ideas in a collaborative, authorial role. The form of these interactions need not be formalised. They can be mapped in a loose and humorous way, which connects cities in a globalised frame and environment by a human critique which prioritizes the personal and the different over the detached and homogenising forces of globalization, hence reshaping our notions of citizenship.

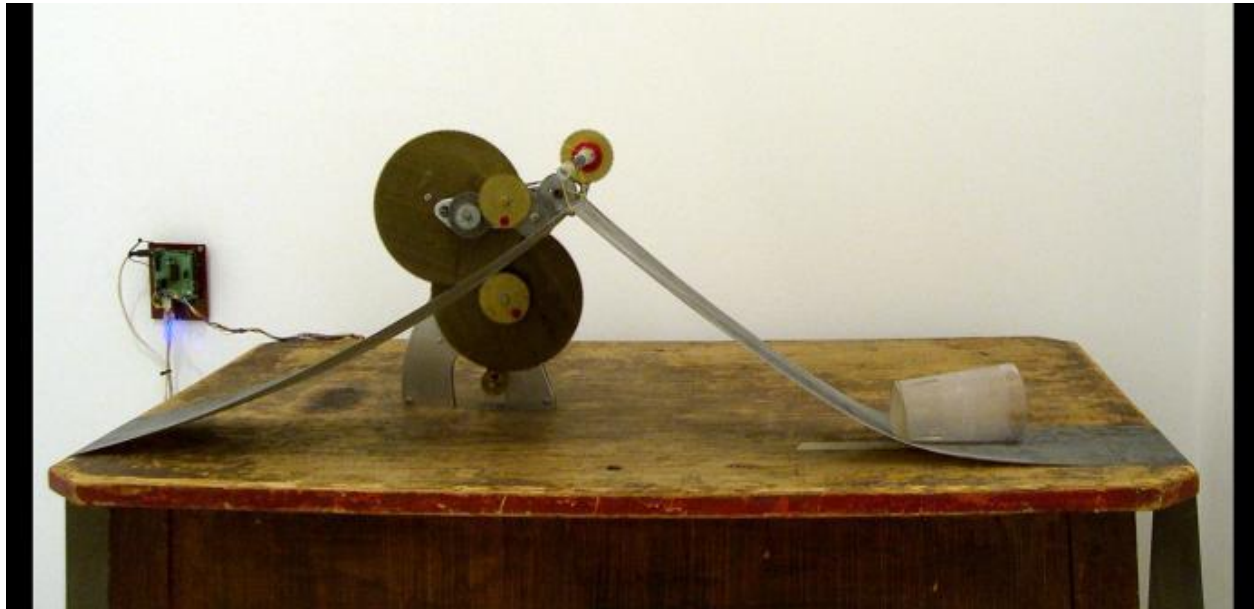
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DELAY AND NON-MATERIALITY IN TELECOMMUNICATION ART

RAIVO KELOMEES

My interest in delay concerns its ability to be part of the concept, when delay between sequences of creation, elements of time-based artwork, exposition and reaction or feedback becomes an integral part of the interaction with the artwork and inseparable from it.



Nothing Happens, 2006, Nurit Bar-Shai, internet project, <http://nuritbarshai.com/nh/nh.php>

1. INTRODUCTION

We can describe art as an asynchronous delivering of messages over physical or time distance. It maintains presence from the past and from far away, distant presence. Masters have been making artworks which are perceived by audience hundreds and thousands years later. It could be, that the sender of the artistic message has not been in existence for millennia (like authors of cave paintings). In this case, interaction between sender and recipient is not possible, but still, the act of delivery exists as there is a receiver.

We could create an imaginary axis of reception divisions, based on delay, where there are works of art on one side, whose 'transmission' to the receiver has lasted for millennia; and artworks sent and received in real time on the other side. Although this kind of formulation points to the vocabulary of information theory and though this viewpoint has been considered, art in this presentation has not been dealt with in this way.

Delays between performative acts and non-materiality in participative works are substantial attributes in new media art, but there are many examples in earlier art practice and art of the 20th century, which belong to the rich history of non-material art.

My interest in delay concerns its ability to be part of the concept, when delay between sequences of

creation, elements of time-based artwork, exposition and reaction or feedback becomes an integral part of the interaction with the artwork and inseparable from it. Naturally, we can distinguish other episodes of delay, like one which is happening between creative intention of the artist and creative execution of the artwork.

2. FROM PAINTING BY TELEPHONE TO INTERNET ART

László Moholy-Nagy's "Telephone Paintings" were made in 1922 and were almost the first examples of early telecommunication art. Evidently, as historians write, he got his ideas from „Dada-Almanac”, which was edited by Richard Huelsenbeck in Berlin in 1920. Huelsenbeck presented the provocative notion that images could be ordered by telephone. It inspired László Moholy-Nagy, who lived in Berlin. [1] László Moholy-Nagy wrote:

In 1922, I ordered by telephone 5 paintings in porcelain enamel from a sign factory. I had the factory's colour chart before me and I sketched my paintings on graph paper. At the other end of the telephone, the factory supervisor had the same kind of paper, divided into squares. He took down the dictated shapes in the correct position. (It was like playing chess by correspondence.) . Thus, these pictures did not have the virtue of the "individual touch," but my action was directed exactly against this overemphasis. I often hear criticism that because of this need of the individual touch, my pictures are "intellectual". [2]

We can say that in 1922 the first attempt was made to create and deliver a computer graphic picture over distance. The author was „removed“ from physical result of his work.

If we think more deeply about the process of creation of Moholy-Nagy, then there are different steps, activity and delay sequences: delay between when artist is telling which square to colour and the factual colouring of it in the sign factory. Then, after the information has been delivered, an enamel painting was produced. There is a second delay between the second and third activity. After the physical paintings were sent to author, there is a third delay, or feedback which shows how the message was understood. Then, paintings are exhibited, the visitor/audience sees them, visual information is transferred directly to the viewer. The time between presentation and reception is the fourth activity sequence and delay.

We can describe this Moholy-Nagy's order of telephone painting in the terminology of an information model: sender, message, transmission, noise, channel, reception, receiver and feedback. Moholy-Nagy, the artist, is the information source and sender of information, in between there is noise - which is irrelevant, as we see - information was received by the supervisor correctly.

According to traditional understanding, delay in aesthetical communication could be defined as time which lies between completing the artwork by the artist and the perception of it by the viewer.

What I want to discuss is the disappearance or shortening of the delay between when the creator has finished the artwork and when viewer perceives it; and the situation where (by means of interactivity), the act of creation and the act of perception belong to the performative telecommunication artwork. Another interesting aspect is the inter-relation and exchange between creation and perception, so that perception and action, where it leads, becomes input for the next act of creation. There is a situation,

where presentation of an art object becomes a performance between the artwork and the user; it becomes time-based art where both the artist and the creator and receiver are taking part and where feedback from the receiver becomes input for artist, for the next stage of his creative activity.

Also, I would like to show that the delay between action and perception, or different sequences of activity, could be an essential building element - it could belong to a functional part of the artwork.

We can mention the delay which lies between instruction given by the artist and the execution performed by the same artist or somebody else, similarly with programming code which is written by the artist and will be executed by the computer or user.

3. PRE-DIGITAL ART EXPERIMENTS

I would like to characterize the fact that delay has been point of interest in earlier electronic artworks, bringing two examples: Richard Serra "Boomerang" (1974) and Dan Graham's "Time Delay Room" (1974). Works were done in same year and period, when experimental activity of artists' was internationally at the highest point.

To describe Richard Serra's work, I'll quote Rosalind Krauss sufficient description and interpretation, where she analyses artists' position inside the artwork, which is essential in video-performances built on feedback.

...a tape made by Richard Serra, with the help of Nancy Holt, who made herself its willing and eloquent subject. The tape is called "Boomerang" (1974), and its situation is a recording studio in which Holt sits in a tightly framed close-up wearing a technician's headset. As Holt begins to talk her words are fed back to her through the earphones she wears. Because the apparatus is attached to a recording instrument, there is a slight delay (of less than a second) between her actual locution and the audio-feedback to which she is forced to listen. For the ten minutes of the tape, Holt describes her situation. She speaks of the way the feedback interferes with her normal thought process and of the confusion caused by the lack of synchronism between her speech and what she hears of it. /.../

As we hear Holt speak and listen to that delayed voice echoing in her ears, we are witness to an extraordinary image of distraction. Because the audio delay keeps hypostatizing her words, she has great difficulty coinciding with herself as a subject.

/.../

The prison Holt both describes and enacts, from which there is no escape, could be called the prison of a collapsed present, that is, a present time which is completely severed from a sense of its own past. [3]

Nancy Holt finds herself in the "prison of a collapsed present" and such "self-encapsulation" is visible in other video artists works, for which Krauss brings projects by Vito Acconci as examples. In this context this example shows the essential importance of delay, it belongs to the form and concept of the work. Delay between spoken and heard text deeply penetrates the perception mechanism of the speaker. The speaker is distracted to such extent that she is not able to form sentences. Additionally we can speak about a metaphorical level of being in the "prison of a collapsed present".

The delay in Dan Graham work "Time Delay Room" belongs to the same sense. Visitor enters the room, where on one monitor he sees himself with 8 seconds delay, on the other screen view to the other room

with same situation. Here the visitor will experience an uncanny situation where he sees himself as almost real-time feedback image and recorded image in the same one image.

Seeing himself as a delayed and mirrored image evokes intention to “freeze”, allowing image to “follow” the object, and intends to identify himself with the mirrored image through movement and action.

A game with the delay is visible in the Graham’s work “Yesterday/Today” (1975). Viewers in one room see a transmission from the other room but the sound recording has been made day before. As a result we see accidental overlap and divergence between image and sound. These two examples show us importance of delay and accident in the artwork. As a result there is constantly changing artwork, which challenges the viewer.

4. MULTI NODAL ART

There is historical internet artwork - Refresh project (1996), [4] by a group of artists and referred to as "Refresh - Art Project: Multi nodal net art", more than 20 WWW pages located in many servers of Europe and the US were linked together in a loop through which the visitor would be „thrown“ automatically after 10 seconds to another page. The project used a “refresh” meta-tag, a command within HTML. The command tells browser software of the PC of the user to automatically go to a particular page after a certain time. Refresh chain-pages take the user through all pages all over again. A refresh delay of 10 seconds is an integral part of the project.

Meta-tag looks like this:

```
<META HTTP-EQUIV="Refresh" CONTENT="10;URL=http://www.priss.org/fresh.shtml">
```

It brings user to the web site <http://www.priss.org/fresh.shtml>. But it could be any other site also, there where twenty of them.

Andreas Broeckmann wrote:

... the Refresh loop was designed to employ the interconnectivity of the computers and the software infrastructure to create one project that was simultaneously happening at more than twenty different locations, a genuinely distributed artwork whose experiential effect both depended on and transgressed the physical distance between the participants. [5]

Another example is "FragMental Storm 02" by Exonemo (2002).

"FragMental Storm 02 (FMS02)" is a type of web browser. It uses keywords to search the Internet and displays corresponding data onto the screen. In conventional web browsers the graphics and text shown on the screen are positioned in accordance with instructions included in the mark-up language HTML. In contrast, FMS frees text and graphics from their HTML, scattering them randomly over the screen. [6]

Before its use it should be downloaded to a local computer.

This work is constantly in redesign and regeneration. The result is changing, evolving and we can speak about another kind of delay, or waiting until the artwork complete (if the user ends it) or does not complete. It is endless - it is not repeating itself in detail, but still we can say that it becomes comparable, as it starts to look similar if we don't intervene by clicking and refreshing it. It reminds us rather time based art, looping video installation and it has been exhibited as installation as well.

We can say that the delay here is rather traditional, not like in the Refresh-project, where it was an integral part of the artwork. Here the viewer or user is “requesting” visual composition. After that programmed code retrieves visuals and text from the Internet in real time and mixes them, it plays with them “creatively”. The viewer in fact is “ordering” the artworks next phase and it is “performed” and “delivered” to him. Everything is based on functional software designed by the artist.

We can describe all artworks which are defined as “participative” or “interactive” in the same sense. Artwork changes or presents its variations after user input, it gives feedback, and it talks back. Dependant on the complexity of the software or hardware it could happen more or less interestingly. A dialogue is taking place between the artwork and the user.

5. DIALOGUE AND DELAY

For describing the specific quality of telecommunication art, Eduardo Kac has used the terms “dialogism” and “dialogical art”. Kac [7] wrote that “there is a clear difference between dialogical art and interactive art (all dialogical works are interactive, not all “interactive” works are dialogical)”. Also, he wrote: “dialogical aesthetics is intersubjective and stands in stark contrast with monological art, which is largely based on the concept of individual expression.” [8]

Kac writes that the roots of contemporary dialogical art experiences can be traced back to this arc of experimentation ... —from modern avant-garde collaborations and interactive propositions to the dematerialized and participatory events of the sixties and seventies. [9]

Telepresence art offers dialogical alternatives to the monological system of art and converts telecommunications links into a physical bridge connecting remote spaces. [10]

After Kac reason for appearance of dialogical art is „... increased dissatisfaction with concepts of art centred on the individual and on romantic heroic myths...”

Shortly we can describe dialogical art as art which produces new content during interaction with it and that the artworks’ physicality or visual, audible or other content is changing. The artwork is not the same in beginning as it is in the end.

I’ll bring for example a work by Nurit Bar-Shai, an online performance in three acts - “Nothing Happens” (2006). [11] The author describes it as interactive telematic mixed media live streaming installation with custom made software:

Nothing Happens, is a networked online performance in which viewers work together to make a series of objects tip over. The performance consists of three acts, which are centered around staged environments - a high shelf, a cluttered tabletop and an empty floor. Each scene contains a central protagonist, respectively: a cardboard box, a glass full of water and a wooden chair. In all three acts, web-enabled physical devices, controlled by viewer’s clicks, make these objects tip over. When this happens, the performance is over. [12]

The website allows physically distant observers a chance to participate. In one direction, the site displays live images in real time of the current as it unfolds. In the other direction, users are able to click a simple interface in order to manipulate the scene.

The key aim of interactivity in this performance, as the artist writes, is to create an immediate and understandable form of interaction, so that each click of a user is rightfully perceived as developing the scene further. [13]

In this work we see paradoxically real materiality elements which are part of the telecommunication artwork. The user and participant operate in a real time factual distant reality, like an operator is manipulates with hands of robots in space. The internet performance of things is linear, it has beginning and end. The result is predictable, but different in its speed. Naturally, real-time transmission or bandwidth influences the execution speed of the clicks and the speed of refreshed images on a website where we see tipping objects.

This discontinuity of internet performance, that it could be defined as an act-and-wait strategy, is similar with other interactive artworks where the user acts and waits for feedback. Here we see that the delay between images, which is defined by the transmission speed of the network, defines the activity of user. The slowness and predictability of the performance gives the user an opportunity to follow the process, it really fits with internet speed. We can expect a possible rupture of communication if the speed changes, if it gets faster and the view on the installation is not refreshed with sufficient speed. The user cannot follow the performance. Not this one, probably, as it is predictable, but some other event of remote controlling.

In case the user meets a non-predictable installation, each act of the user is defined by changes of the artwork. The same is happening in real dialogical situations in human communication, where questions and answers could be random, even the topic could change and new content could possibly emerge.

6. CONCLUSION

The speed of data transmission defines the delay between acts of communication (which could be an act of creation and an act of reception) as much as processor speed defines the execution of algorithms in a computer which allow selecting more complex tasks to realize. It means that images with higher resolution could be rendered or videos with higher frame rate could be edited. Higher speed of transmission and short delay in real-time communication gives the possibility to follow much quicker movement of a distant object and to see a much higher resolution of images.

Importance of delay in interactive and telecommunication art:

- Delay in traditional communication sequence, between creator, artist and receiver/user/viewer is becoming shorter and we see even disappearance of delay in this communication act.
- Viewers meeting/encountering visual art, interactive art and telecommunicative art is time-based performance, which could be divided into reception and feedback sequences, where delay plays important part. Length of delay influence content of artwork.
- Delay between different elements/sequences of time-based telecommunication art is integral part of the work, like pause is integral part of the musical piece. Time sequences where nothing is happening, where viewer is waiting (for feedback from artwork from local computer or distant server) is becoming part of the time-based interaction between artwork and the viewer/user.

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NEW MEDIA EDUCATION IN A CHANGING ENVIRONMENT OF PSYCHOLOGICAL, PROFESSIONAL AND SOCIAL CONDITIONS

RAIVO KELOMEES

I would like to look at new media education from the point of view of psychological, professional and social problems.

Is artistic imagination influenced by the medium of expression? Is imagination renewed with new media? I mean new media in general – new technology, new tools? Is talent specific to a medium or is it universal? If we call anybody talented, then his talent will appear anyway, despite technological or social conditions, or not?



Net-Poetry 2, 1997, Nelli Rohtvee, Internet-project, <http://lizard.artun.ee/~nelli/nellinet/net1.html>

I will deal with the issues related to psychological, professional and social matters in art and art education in relation to new media.

1. Psychological problems

One question deals with the identity of the artist in relation to creative means. To what extent is the artist's imagination and thought process "new" because he or she is dealing with new media? Can we say that the artist's thinking renews itself after the emergence of new means of expression, that technology influences artistic expression? Can one say that if someone is talented, then there is no difference in what medium he or she uses? Is talent medium specific or is it universal? Can a talented person break through in any circumstances or does every talent require a certain configuration of conditions and means to blossom?

The artist's chosen medium influences how the artist understands himself. Art mediums are different from the point of view of the self-presentation of the artist, the difference being in how they "take in" and represent the author. Some means and mediums are better for observing and picturing the outer world and others are more as means of contemplation and self-observation. From time to time some

means of use of art mediums take on the parameters of mania or art form. A certain trend and movement emerges during which a floating manifestation is taken by groups of artists and it spreads as a virus.

One could notice manic manifestations in the 1990s when new media and digital technology entered the art scene. Artists were excited and the amount of production was unprecedented. Some works that surprised 10–15 years ago seem ridiculous. But some works that seemed ordinary and too simple with their “boring human problems” seem exciting now. They have stored the time and the people, showing us that irrespective of time and medium art deals with human existential questions.

Elation about the medium is natural when artists are excited about the nature of creative means. Subjective excitement about new means is similar to enjoyment that comes with new clothes, books, a car or a house. It is a time when things seem new, reality seems new and the whole life seems new. This is what factually takes place: the medium, the means and the creative environment that artists use does not only change them and how they see themselves, but also how they see the world.

Here we can recall McLuhan, who wrote that every society and time has its dominant medium – audible, written or visual. Mediums influence how people think of themselves and the world. When people started reading books, an opportunity rose to escape the earlier collective world, where they were connected by sound and sight. Books and new media at the time pulled them from the physical world to the imaginative and mental world.

In this sense art mediums are a means of interpreting the world and one’s self. Using them, artists describe who they are and what the world around them is like. Artistic mediums can be seen as a shield, a screen of sorts and a tunnel, through which the artist sees the external world. The ambivalent function of the medium is obvious as a means of self-reflection – art as a mirror and a window. From this point of view we can describe almost any medium in art history: artists used these mediums to reflect themselves and view the external world.

Still, it seems that the most important parameter of an artist’s identity is motivation, the willingness to be seen in action in his or her own field. To possess skills to say something is always possible, while to obtain willingness to say something is not. It either is or is not. Maybe this is “talent”, without which it is impossible to describe the author? The author’s motivation is this “author’s blood” that makes it possible to separate those who are creators and those who are not.

2. Professional problems

Eternal questions: how qualified should the artist be in technically implementing the medium? How much should he know how to use software and have computer skills to work as an artist and author of new media?

We can ask the same about traditional art. How good of a drawer must a painter be to be a good painter? We can also ask: how much skills and knowledge must a new media artist have so that he could be called a new media professional, a “very good” professional?

How much does an artist have to have skills to express freely and forget the “weight” of technology? It is a question without an answer, the scale is not set. And the criteria are certainly not objective. The usage

of skills is lead by the artist's mental preparation, which leads the "dosing" of skills depending on creative needs.

The notion of "new media professional" is kind of pointless, but it could also be seen in a narrower meaning, without ascribing expertise the person in every sub-section. In an ideal case we are dealing with a multi-specialist – and there are few of them. The "multi"-domain contains elements such as sound, video, graphics, hypertext, and programming and if we add cultural competence and economic expertise, we get the attributes of a third millennium artist.

There are several viewpoints in the question of new media and technological competence. First, a lot of works have been created with a simple unique message, which is not so much dressed in means of new media, as it is born using means of new media in a very simple way. New media is not merely a carrier of information; it is also an organic environment where art is born. Take for example Olia Lialina's „IF YOU WANT TO CLEAN YOUR SCREEN“(1996) [1] and Nelli Rohtvee's („Net-Poetry 2“, 1997). [2] Remarkable works of art have been created by top technological specialists and work groups, that "speak to" the universal and the human and are not hermetic, meant for a circle of experts. A fitting example is "Osmosis" (1995) by Char Davies.

3. Social problems

I have dealt with this issue in the article "The Forum of Latera E-Mail Group," [3] which described art social transformations in the Estonian art of the late 90s. Art collided with new "hot" digital mediums. People that had earlier set in the art hierarchy could not find anchoring points. But here one should stress the part of art education and changes taking place in the social environment that influence art education.

If in a political and economic sense it is accustomed to view the last 20 years as "liberation" and "renewal" then in a mental and social sense one set of rules has replaced the other. From the viewpoint of eternity there is no estimated valence. The main parameters that describe the social set of rules are three domains: the distribution of information, resources and reputation.

All of these we have seen before but the present society is different, as these have been remarkably integrated with art education. The same has happened in the art life as a whole. This integration means that the fight in this field has obtained a meaning of existential fight. The most important goal of achievement is the ensuring of meal and survival. To observers this seems as a specialized, professional or pedagogical activity; as a very refined, thoughtful and cultural activity.

In the landscape of information gathering and reputation creation the fight is being fought over guaranteeing maximal resources for one's own activity. The connection is definitely direct, but not absolute. The borders exist because whatever highly reputed pedagogical initiative does not automatically serve maximal resources; will not find reward nor living space from society; if its existence even remotely damages the interests and territories of existing artists.

There seems to be space but it is not handed out. At some point a situation of power play emerges – who is after whom? Who has a louder voice and a better lobby has a better chance of winning. The content is of secondary importance. The persuasion of the public and the deciders of one's advantages is the core of the game. Activity and aggressiveness can achieve a lot on this level.

The entrance of new means of creation to the field of art education in this way is characterised by three everlasting spheres where change and changelessness can be noticed: the psychological, professional and social aspect. These are the self-determination questions of the author, the questions of defining the level of professional activity and the social influence to the previous. Definition battles in the field of the creation of meaning in society directly affect the artist's identity and the assessment of the quality of his or her actions.

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CALCULATING THE CURVATURE OF CROCHETED PETALS – A POST-MEDIA EXPLORATION OF DOMESTIC CRAFT-BASED TEXTILE PATTERNS

GAIL KENNING

This paper explores opportunities for extending the possibilities craft-based textile activities, through dedicated software tools to explore and interrogate textile processes. It reports findings from an experimental art project to produce software as tools for creativity in craft-based textile activities and advocates a rethinking of craft-based textiles beyond 'fixed media'.

Digital media and new technologies are ascribed a seminal role in the perceived increase of craft projects, do-it-yourself (DIY) culture, the production of user-generated media content, and user-led participatory practices (Gauntlett, 2011; Jenkins, 2006). The rapid development and accessibility of sophisticated audio visual technologies has reshaped media production and consumption enabling amateur photographers, film-makers, writers and musicians to utilise digital media not only in the production of their work, but also in its storage, dissemination and consumption (Jenkins, 2006). Digital media also offer the potential to extend and reconceptualise craft and DIY projects including domestic craft-based textile activities such as knitting, crochet, weaving and lace making that have been considered and seen as limited to physical 'hands on' activities.

Digital media and new technologies allow expansion and reconceptualisation of these types of craft activities in four ways. They facilitate the distribution and sharing of project templates, patterns, instructions and 'how to' information across geographic, social and cultural borders. They also enable users to display images, videos and information about completed projects. Third, digital media create audiences and communities through online forums and viewing spaces. Finally, and most importantly, they offer the potential for the development of tools, such as software applications to allow users to extend and explore their own creativity.

This paper shows how digital media can extend and reconceptualise domestic craft-based activities using experimentation enabled by the production of dedicated software tools for craft-based textile practitioners. It draws on an ongoing experimental art research project which interrogates domestic craft-based textile processes in an effort to examine the creative potential of craft-based textile pattern forms and argues that there are potential social and cultural benefits from the development of tools for creativity that aid experimentation and exploration.

The project advocates a rearticulation of craft-based textile activities beyond 'fixed media' and embraces the non-media specific nature of craft-based textiles which have operated as text, in diagrammatic form, as threads, and more recently as pixels, bio-materials, mathematic functions and computer code.

Craft-based textile activities have a long and complex history. The textile fragments that have survived inform our understanding of the development of techniques and pattern forms. In addition, woodcuts, booklets and magazines, paintings, photographs, and notebooks and journals reveal craft-based techniques, patterns and styles and attest to the longevity and importance of craft-based textile activities as a creative practice (Shepherd 2009).

The mass media play a role in promoting craft activities and DIY projects in relation to fashion and trends through magazines, pattern booklets and 'how to' styled TV and radio programmes (Greenhalgh, 1997; Johnson, 2005; Schofield-Tomschin, 2001). In observing that "both the amateur arts and crafts are undergoing what has been described as a 'boom time'" (2004, p269). Turney suggests that this renewed popularity is due to increased levels of education, participation by women, an ageing population, and

more access to leisure time as a result of the changing nature of societies and their workforces (Turney 2004).

These activities are what David Gauntlett (2011) describes as acts of 'everyday creativity' and are important to both individual participants and society as a whole. Jenkins (2006) suggests that they bring about "a changed sense of community, a greater sense of participation, less dependence on official expertise and a greater trust in collaborative problem solving". Craft activities and DIY projects fulfil a desire to make or be involved in a creative process (Gauntlett, 2011, Turney, 2004). They may be seen as expressions of symbolic creativity: of the drive to create. Turney (2004, p276) argues that "symbolic creation is an essential part of everyday life and a demonstration of the real and ideal self" (2004, p276). Certainly in relation to domestic craft based activities, there are many reasons for promoting the continuation of these activities at a grassroots level. Craft-based textile activities have been cited as being important in the continuation of tradition, the development of creativity, in providing a sense of community, in the construction of personal identity and for healthy ageing (Schofield-Tomschin, 2001; Johnson, 2005; Minahan, 2007; Turney, 2004). These acts of 'everyday creativity' are self-driven, self-directed and self-fulfilling activities (Atkinson, 2006). The number of practitioners, the level of commitment, enthusiasm and labour invested in 'everyday creativity' without tangible reward suggest that these activities are driven by intrinsic motivation – that is "for its inherent satisfaction rather than for some separable consequence ... for the fun or challenge entailed rather than because of external prods, pressures or rewards" (Ryan 2000, p56).

However, while these acts of 'everyday creativity' are in abundance, the level of creativity involved has been subject to criticism. Craft-based activities, including textile activities, are accused of being 'low', repetitive, manual, non-creative, non-challenging, requiring little or no skill, and of little value in relation to the arts (Atkinson, 2006, Greenhalgh, 1997, Turney, 2004). Turney suggests that "the marginalization of home crafts from academic discourse is largely based on an understanding that both practices and objects are 'uncreative', repetitive and mundane, existing outside the world of the innovative, creative, challenging avant-garde" (2004, p268). These activities draw criticism because of their seeming culture of duplicating, copying, and the recycling of pre-existing forms, and their reliance on pre-designed kits, patterns, and templates (Turney, 2004, Atkinson 2006) suggests that kits patterns and templates are in effect 'dumbing down' craft, which he suggests is part of their attraction.

This culture of copying causes concern in relation to the standardising effect it has. For instance, Pen Dalton says "the encouraging of dependence on projects from women's magazines, patterns and pre-designed kits, however well designed and demanding of the patience and skill of the housewife, has had a standardising and largely detrimental effect on craft practice" (as cited in Atkinson, 2006). My PhD thesis argued that the continual recycling of crochet lace patterns and the focus on the production of an object had seemingly resulted in a stasis in the pattern form and that the creative potential of the activity is yet to be fulfilled (Kenning, 2007). While mainstream radio, TV and magazines contribute to the seeming renewal of popularity, there are concerns that they also contribute to the standardisation of these activities as a result of the scale of production and distribution of kits, patterns, magazines, books that encourage the construction of similar popular patterns and projects (Beegan, 2008). Websites, blogs, television programs, books, and magazines encourage and promote craft activities by providing 'how to' articles, templates and patterns, and instructions for 'personalised' rather than experimental or self-explorative craft projects. Such projects equate creativity with the customisation or individualisation of prescribed forms.

This paper proposes that it is to digital media and new technologies that we might look for new tools for creativity, and that they may offer the potential to extend these forms of activities and reveal a form of 'everyday creativity' uninhibited by the strictures of the template, the pattern, and the seductions of the mass media.

Before examining how experimentation can be introduced through the use of digital media, it is useful

to explore why there is a seeming lack of experimentation and acceptance of this culture of copying in 'everyday creativity'. Jenkins (2006) suggests that these activities emerge at a grassroots level, are learned through informal education, and arise out of shared traditions (Jenkins, 2006). This gives rise to a sense of responsibility in relation to the continuity of these traditions which inhibits experimentation. In addition, both Jenkins and Turney suggest that the lack of innovation and experimentation may be due, in part, to many 'everyday' craft practitioners being educated to primary and secondary level and having an institutionalised view of what constitutes art, design and craft and what is considered acceptable experimentation within those fields (Turney, 2004). Such participants often need to be given 'licence' to extend their creativity beyond the conforms and confines of their formal or informal teaching, pattern books and kits.

Recent developments in craft-based textile activities have resulted in young participants applying innovative approaches to craft activities in the form of guerrilla crafts, S&M knitting and yarn bombing (Kenning, 2009). However, for the most part, these experimental approaches remain in the minority.

The impact of digital media on acts of 'everyday creativity' involving filmmaking, photography, video, music, and so on, has been discussed at length and is evident on websites and social media sites across the Internet (Jenkins, 2006). However as previously discussed, domestic craft-based textile activities have until recently primarily used digital media as communication tools, and it is only now that we are beginning to see the development of software applications that may be used in the production, rather than distribution, of domestic craft-based textile activities. Developers of these software applications and digital media tools, include craft-based textile practitioners who want to speed up the design process; craft product suppliers who wish to extend their range of products or increase sales; software developers that have recognised a growing market for applications that can visualize craft forms; and open source developers who are interested in sharing both craft instruction and code.

Examples of digital media developments include mobile applications that are being used as aggregators of news, information and videos about craft projects and techniques. Another software application, Knit Visualizer represents text instructions in diagrammatic form to enable quick referencing during physical construction of textile objects (Foundry, 2010). Some applications translate text instructions into computer code to visualise and modify patterns online (<http://stitchworkssoftware.com/>). One open source project knitml aims to standardise knitting instructions and create a mark up language for knitting to enable any knitting pattern to be rendered and visualised. However, many applications continue to act as communication tools or visual design aids. In these examples the media (code, algorithms, pixels) used do not manipulate or influence the pattern outcomes unlike in the physical environment where the media, the choice of threads, hooks, technique etc impact on the final form produced. In addition, these software applications neglect the processual and procedural aspect of domestic craft-based textile activities and do not engage with the processes inherent in both craft-based textile activities and digital media. Thus they do not provide a platform for true experimentation.

With limited approaches to experimentation the risk remains that domestic craft-based textile activities will continue to copy and recycle pre-existing patterns forms and projects, and will fail to escape the ongoing criticism regarding their lack of creativity and not achieve their creative potential. Whereas the digital environment can offer valuable insight into the making process, and the potential to provide a greater understanding of how craft-based textile activities and patterns can develop, and how creative possibilities can be extended (Kenning, 2007).

In discussion of textile activities in relation to digital media, domestic craft-based textile activities are frequently positioned as physical, material and tactile and contrasted with digital media which often cited as lacking physicality, materiality and tactility. While this view is contested and arguments have been made for the materiality and tactility of digital media, it is not within the scope of this paper to explore these arguments in detail (Munster, 2006).

When participating in domestic craft-based textile activities engaging with the media, that is physical

threads and fabrics, is often assumed to be the motivation. However, research suggests that the issue is more complex, and while engaging in a process is important the construction of a physical artefact is not the primary reason (Atkinson, 2006; Johnson, 2005; Minahan, 2007; Schofield-Tomschin, 2001).

This tension between what we might consider the creative process and the output occurs in other activities. Activities manifest in a range of media other than what would be their expected material form. For example, materiality produced using chemicals and paper is no longer required for photography. For many, only the skeumorphic click of digital cameras and Photoshop icons remain as clues to past physical processes. Similarly, architecture such as Liquid Architecture has no intention of realising the architectural forms as physical structures. In addition, we might also think of the relationship of the musical score and the written play to the performance. The score and the play can and do undergo rigorous critique in absentia of the performance. These examples point to potential for creative opportunities beyond a single medium.

Freed from the constraints of being manifest in physical threads, domestic craft-based textile activities participants are free to explore not only the processes of domestic craft-based textile activities but also computational processes of the digital environment to exploit algorithmic variation and explore mathematical functions. My PhD thesis identified that craft activities can draw on computational possibilities for AI and explore potentially evolutionary and emergent possibilities in the digital environment and in the physical realm. This enables new forms, patterns and shapes that have been difficult to make, imagine or understand before sophisticated computational possibilities to be modelled in a range of digital media applications and realised physically through hardware and peripherals such as 3D prototyping. This ongoing experimental art research project to explore creative possibilities for domestic craft-based textile activities has undertaken a variety of approaches. A range of findings from the project have been presented at the Textile Society of America Symposium, ISEA 2009 in Belfast and, more recently, at the Subtle Technologies festival in Toronto.

Initially the project took the form of a software application to mate and mutate domestic craft-based textile activities patterns. However, limitations were imposed, not by the media itself, but because of the teams' understanding of what constituted craft-based textile patterns and their expectations. The application enabled users to mate and mutate patterns, but the parameters were restrictive because they initially focussed on the appearance of the pattern forms. In addition, aesthetic judgement was applied too early in the process and prevented patterns developing beyond conventional forms. The second stage involved aligning the algorithm in digital media with the decision-making process undertaken in physical construction of the patterns. This involved, in effect, neglecting the final form and focussing on the placement of individual stitches or motifs in relation to the last stitch or motif made whether the position was correct or not. Thus, glitches and errors in any part of the process were embraced and often became exaggerated in subsequent rounds, leading to the creation of seemingly random forms. It allowed for the creation of pattern forms that could not be created without the use of digital media.

Both of these areas of investigation are ongoing. However, the more recent developments have focussed on the construction of motifs in order to reveal the unacknowledged mathematical formulae that underlie many of the shapes used in Irish crochet lace. The work identified mathematical formulae that create visually similar forms and then used these functions to manipulate the motifs and extend the form. A crochet lace collar from the Powerhouse Museum lace collection in Sydney was used as the source material. The lace collar, which was crocheted in 1850, consisted of four primary motifs repeated at intervals. The motifs were representations of nature, the daisy; shamrock; rose; and spiral form, and can also be described using mathematical formulae such as $y = n^{1.4}$. As simple mathematical formulae, the variables can easily be changed allowing for the overall patterns to be manipulated quickly and effectively. The pattern becomes a product of the design of the maker and computational processes.

Thus, pattern-making in the digital environment allows for a range of systems to impact, interact, intertwine and intervene with each other and can harness generative possibilities, mathematical systems computer code, and craft-based textile techniques to stimulate domestic craft-based textile activities and create new possibilities.

A post-media approach opens up new possibilities, affording potential for experimentation in a form of creativity that has not been previously examined in this way (Manovich, 2002). It allows for the discovery of new forms and new ways of making and creates new sites of 'everyday creativity'. For those not familiar with digital media or computers, digital media allow exploration from a position of strength by focussing on DCBT processes already learned. For those familiar with digital media, experimentation enables users to explore new ways of making and may stimulate interest in making new pattern forms in the physical realm. As well as its implications for creativity, development of craft-activities beyond the manifestation of physical objects also has potential health and welfare benefits as it frees users from the requirements of materials and physical dexterity, affording whole new ways of working which can be particularly important for the elderly and those with injuries or disabilities.

These creative processes can be made readily available to older participants who have an in-depth knowledge and understanding of craft-based activities both in terms of a tactile engagement with materials and in the construction of textual instructions and diagrams, but have limited dexterity. For them it offers ways of stimulating the mind and hands through ongoing making processes through for example patterns generated through voice recognition or sound. These participants are often keen to remain both physically and mentally active. Therefore, digital media tools for creativity present opportunities to prolong involvement with pattern making activities promoting both physical and mental stimulation. In addition, digital media offer the potential for work in groups through networked activities and for example interactive table-top.

Digital media tools for creativity may provide benefits both physically and mentally. This is particularly advantageous when we find that people are increasingly identifying themselves in terms of their creative outputs, and symbolic creativity rather than their job (Castells, 2000).

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ENTREPRENEURS, SQUATTERS AND LOW-TECH ARTISANS: DIYBIO AND HACKERSPACE MODELS OF CITIZEN SCIENCE BETWEEN EU, ASIA AND USA

Denisa Kera

The global spread of alternative R&D places outside the universities and corporate labs offers an integrated model for art and science cooperation and public participation in science. These places (Hackerspaces) and projects (DIYbio) offer a direct involvement of citizens in the R&D process in term of translational and participatory research. What are the opportunities and challenges of these novel institutions across the globe?

The research for this paper was conducted as part of a grant from the EU centre in Singapore “Participatory policy model for emergent technologies: comparative study of alternative R&D spaces in Singapore and EU.”

While media, government, non- and inter-government organisations were speculating on the size of the Fukushima Daiichi nuclear disaster and discussing issues of nuclear safety, standards and policy measures, individuals and small groups of citizens involved in grassroots science activities around the world were measuring, monitoring and crowdsourcing real-time radiation data over DIY tools and sharing data over the web. [1] This agile and resilient response to a situation of insecurity and lack of data was initiated by people around the Tokyo Hackerspace [2] and their friends from Portland and Los Angeles with connection to the global Hackerspace community. [3] It resulted in creation of a platform, Safecast.org, over which data on radiation are gathered from almost 300 nodes [4] and which also serves as platform for supporting creation and distribution of DIY Geiger counters.

Hackerspace community is just one of the examples of Do-It-Yourself (DIY) and Do-It-With-Others (DIWO) initiatives that are emerging in recent years everywhere around the world challenging our views of citizenship vis-à-vis emergent technologies but also disasters. Fukushima disaster in April 2011 showed how this informal network of Hackerspaces around the world was able to react and coordinate efforts in developing low-tech tools which Akiba, the uber-hacker from Tokyo Hackerspace, poignantly named “Humanitarian Open Source Hardware.” [5] These DIY tools were distributed over another recent prototype of a service, a community market for open source hardware, InMojo. [6]

This immediate, decentralized and global response to a disaster goes way beyond the common but also imagined forms of solidarity and innovation. Crowdsourcing not only ideas but also materials for building DIY Geiger counters and even prototyping and designing new tools such as the Kimono Solar Lantern Kit, a hackable solar powered lantern for \$12 named after a bar next to Tokyo Hackerspace, or iPhone Radiation Dock (iGeigie), portable Geiger counter, present a new type of global and participatory design which combines solidarity and innovation. [7]

These prototypes directly connect technological standards (open source) with deliberations on social action in a global and day-to-day context via various DIY and experimental management techniques. They bring together politics, technology and nature in a direct and transparent way that offer resilient and open structure for participation and decision making. Control and decision making (in terms of monitoring, reflecting and self-organising) are instantly connected to scientific facts, laws and technological

standards via design prototypes, which are political, social and technical at the same time. Design in the case of radiation data becomes a form of participatory but also global and collective action redefining the relations between lay people, science experts and political representatives. Furthermore, the speed of the response, including the actual design of the prototype and the launch of the participatory monitoring of radiation platform over Safecast, took impressive 72 hours of work by enthusiasts from several Hackerspaces around the world. [8]

The Hackerspace infrastructure that made possible the citizen science response to Fukushima was already in place long before the disaster and it is used not only in the case of software and hardware innovation but also in the case of so called DIYbio research specializing on various aspects of biotechnology and even medicine. Similar movements and places define an alternative R&D structure that uses design as a convergence of social and technological innovation. These small scales, experimental, alternative R&D structures represent a convergence of several radical ideas around development of open source software and hardware (Hackerspaces), [9] cheap and open source, digital fabrication (FabLabs), [10] citizen science labs crowdsourcing biotech research (DIYbio), [11] innovative coworking and management structures (HUB). [12] These innovative, coworking experiments paradoxically combine the squat and publically funded culture of the EU art centres with the market driven entrepreneurship rhetoric of the US start up scene to envision research and innovation outside the traditional professional settings of universities and corporate labs. The insistence on low-tech solutions and open source technologies democratizes the whole R&D process to a degree that it makes it possible for developing countries to join as we can see in the case of Fablab in Africa [13] and Afghanistan [14] or the now famous “House of Natural fiber - Yogyakarta new media art laboratory” (HONF) from Indonesia. [15] HONF founded in 1999 is not only one of the oldest alternative R&D place outside of EU or US, but also the most original, because of its unique combination of influences and its relation to the local community and culture. It is an artists’ run organization that is occasionally funded by EU (for example their recent Fablab) thanks to their global art network connected to a festival of new media art which attracts the EU crowds with access to money. However, it is also a coworking space and privately funded organization that is supported by its members in a manner similar to US based citizen labs and Hackerspaces with occasional contact to the local universities and companies.

While in 2008 and 2009 the whole alternative R&D movement gained a momentum in terms of popularity thanks to various citizen science research projects related to Hackerspaces but also DIYbio labs and the Maker’s community, the 2010 marks the start of the global movement which proved its usefulness and resilience in the recent Fukushima disaster. The global movement is defined by various events around the world that identify with the idea of citizen science projects, low-cost and low-tech protocols, lab equipment based on open hardware and shareable and reproducible kits. The common strategy of connecting the DIYbio labs to the local Hackerspace communities is widespread even if it is not the only model. The more socially and critically involved hacking similar to EU art and DIYbio centres is typical for most of Asia DIYbio and Hackerspace scene while Singapore seems to follow more the US orientation to entrepreneurship and personal enhancement. Experimental forms of research, investment and even artistic creativity show clearly how the “low-tech but high-impact” logic of the DIYbio and Hackerspace movement operates in various contexts and how it can connect science, culture and society in ways that traditional policy and public participation in science research could not even imagine.

The artistic and scientific solutions and protocols are affecting but also involving large groups of citizens and stakeholders in the process of the research, creation and innovation. Whether in US, EU or Asia, the Hackerspace revolution involves open source laser cutters and other open hardware tools that can create cheap lab equipment, enable synthetic biology recipes and other protocols to spread like cooking

recipes, self-organized clinical trials and other community related projects that are challenging not only in technological but also in social sense. The strategies and interests of these groups are slowly converging into one informal network between Asia, US and EU enabling very different flows of knowledge and expertise. It also paradoxically embraces, develops and combines two extreme strategies of R&D, on one side the market driven entrepreneurship model following the US, on the other side, the anarchistic, underground model of the EU based squats.

Various forms of bottom-up organizations that appear in recent years around emergent technologies, DIY subculture and novel forms of investment in innovation and entrepreneurship provide interesting case studies for studying the relation between politics and design, new technologies and social movements, emergent “non-humans” in Latourian sense [16] and transforming society. Whether we are speaking of alternative “R&D labs” that are part of some existing cultural and art centres such as Ars Electronica in Linz, ZKM in Karlsruhe, FACT in Liverpool, Laboral in Gijón, or alternative incubators like Hackerspaces, HUBs, MAKE fairs etc. we can witness the crucial role of radical design and politics play in connecting humans and non-humans and experimenting with new networks. The emergent networks are not simply explored by these institutions but actively performed and created by novel forms of research, investment and even artistic creativity and social experiments around open source laser cutters and other hardware, synthetic biology recipes, sharing and discussing DNA data, self-organized clinical trials, various types of performance software, robotics and any simply any emergent technology. [17] Communities of people monitoring, sharing and making sense of various “objective” and “scientific” data in their everyday life are actively exploring and performing the future symbiotic relations between various types of agencies across scales. The true cosmopolites of today are people actively involved in platforms such as Patchube, [18] Carbondoggles, [19] DIYbio list [20] etc. exploring the emergent, often surprising connections, networks, and mashups between different actors and scales.

From nano- and bioart exhibitions to annual new media festivals, various museums of the future and alternative incubators we are witnessing public involvement with emergent sciences and technological inventions that go across business, art and research. The various functions of such spaces from the more obvious like popularization and presentation to the more professional like investment in innovation to the more creative and experimental like envisioning our common future the goal is similar to the early ideas and vision of science, technology and art interactions. It is to foster and accelerate the ability to connect various actors in new networks and ecologies across scales. [21]

The strange paradox in this new type of DIY, citizen science projects and institutions is how the increasing involvement of the public goes in parallel with the as intensive emergence of new actors across scales. The non-humans seem to talk a lot lately via various data that we are able to generate, gather and visualize in the citizen science projects that involve low cost monitoring, sharing and interpretation of various data but also in various hacker and maker projects. The public interest in data defines these new communities intimately connected to their environment on various scales from molecules, DNA and cells to institutions and cities (BioWeatherMap, [22] EpiCollect, [23] and CamMobSens [24]). We are even starting to witness large, bottom-down projects envisioning the future cities as microstates and software platforms performing such new ecologies and systems (Digital Cities, City 2.0, Intelligent Urbanisation, Cities-as-a-service, Smart+Connected Communities, Cisco's New Songdo, IBM “Smarter planet”, HP “Central Nervous System for Earth”). [25] The cosmopolitical future is in connecting actors across scales via data and creation of new dependencies, metabolisms, systems, networks which do not make a difference between the organic and non-organic actors, between the social, political and biological, but create new relations across scales.

These interactions across various scales and not only actors (atoms, molecules, cells, humans, institutions, cities, planets) seem crucial in terms of connecting design and politics. These networks between heterogeneous actors and across various scales hold the key to any future hybrid communities which we are starting to witness with the alternative R&D. While most projects dealing with future communities and issues of sustainability and/or biodiversity still concentrate on the scale of animals, plants and large ecosystems, the interest is slowly shifting to more complex interactions between humans, microorganism and molecules on the micro-level that often defines new communities and micro-ecologies through sensor data. The data we gather about our bodies (for example DNA), society (like mobile use, consumption etc.) and nature (CO₂, radiation, whether, bacteria) are integrated over various platforms and interfaces to help us understand the unique equilibria but also develop and create new habitats. The various functions these experiments from the more obvious like popularization and presentation to the more professional like investment in innovation and more creative and experimental connect politics with design, social innovation with prototypes. These DIY and alternative places perform, foster and accelerate the ability of science and technology to serve different purposes and connect various actors in new networks and ecologies. The very democratic form of these institutions that support bottom-up and citizen science projects defines them as true cosmopolitical laboratories and defines cosmopolitics not only as experiments with novel networks between actors but more importantly between various scales. The main issue of cosmopolitics for this reason is not a problem of the subject-object, animate-inanimate relations but issues of interaction between scales, relation between parts and newly defined wholes.

Furthermore, all these citizen science and bottom-up projects that gather various data, actors and connect scales strangely revive the pre-modern ideas on human and non-human interaction like bestiariums and cabinet of curiosities and the original project of the “Academy of sciences” envisioned by G. W. Leibniz that also speak of such radical hybridity. [26] These novel forms of community organised and financed science and technology labs revive the original idea on science, technology and public interactions envisioned by G. W. Leibniz in his famous “Odd Thought Concerning a New Sort of Exhibition (or rather, an Academy of Sciences ; September, 1675).” In this original vision of the academy of sciences Leibniz ceases to discuss the advancement of sciences and technology in terms of metaphysical and philosophical issues of truth, limits of human mind or the nature of reality but defines science and technology by their ability to generate new ecologies of interest and influence, new institutions, networks and relations between different actors. Science, technology, business, art, entertainment, tourism are all part of an effort to raise human curiosity and wonder and transform the society. Leibniz's prophetic vision of cosmopolitics modelled after his ontology of monads and interactions between different scales is a reality today in the case of hybrid organizations such as Ars Electronica in Linz, ZKM in Karlsruhe, FACT in Liverpool, Laboral in Gijón, numerous small centres around the world and alternative incubators (Hackerspace, DIYbio, HUBs) that connect art, design, technology and sciences in often playful and unexpected ways. [27]

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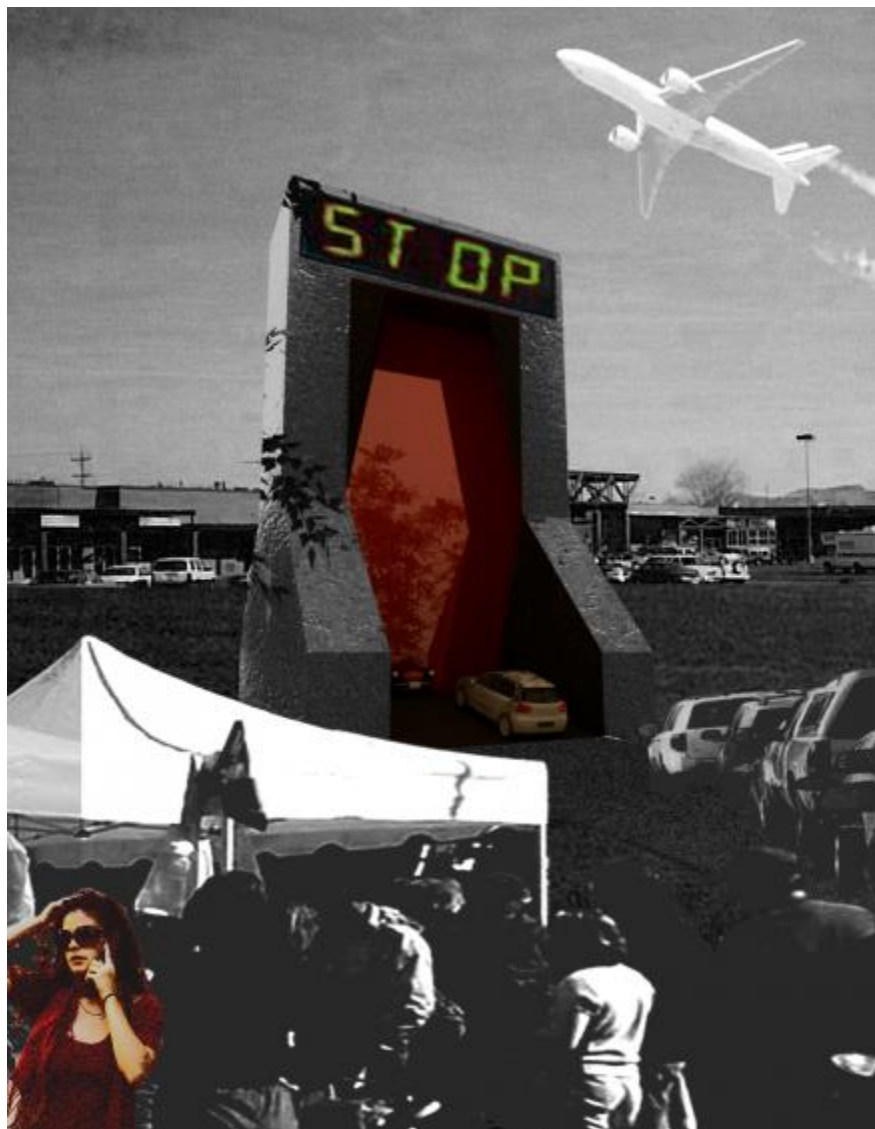
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SECURITY GATE 26.11

John Kim, Anthony Tran & Vasily Trubetskoy

Security Gate 26.11 is an electronic artwork that detects wireless emissions given off by individuals, including cellular transmissions, wifi, RFID, and others. By our participation in informational networks, we actively volunteer information about ourselves to forms of surveillance. Security Gate 26.11 renders visible these invisible mechanisms of discipline and control and documents our participation in possible tyrannies of our own creation.

[AUTHOR\(S\)](#)



Conceptual rendering of Security Gate 26.11 by Molly Reichert.

Metal detecting security gates, such as those used in airport screening, are the sites of discipline leveled against the body. As recognized by Michel Foucault, on our bodies converge different mechanisms of control, as issued by the State, biomedical technologies, and capitalist pressures. For your average traveler, airports have become sites of inconvenience and embarrassment, because of full body scanners, “enhanced” pat-downs and lengthy waiting times. But for those who are profiled because of their ethnicity or political views, airports are sites of humiliation and indignation. This discipline is justified because airports are liminal spaces where the normal right to privacy is increasingly in suspension.

Security Gate 26.11 is an Arduino-based, interactive, electronic art work that detects wireless emissions given off by individuals, including cellular and smartphone transmissions, wifi, Bluetooth, RFID, and others. Security Gate 26.11 produces individualized audiovisual responses to these transmissions. Our lives are subjected to daily forms of micro-level surveillance via mechanisms that are not recognizable to us as such precisely because they are not visible. Today, wireless transmissions are the corpus of control and repression, as evidenced by sophisticated governmental systems of mass surveillance and snooping (Carnivore and its variants) and corporate monitoring (data-mining and software recommendation systems).

The internet provides us with indispensable communication tools in exchange for the ruthless commodification of our lives. Online we constantly volunteer intimate details about ourselves to capitalist appropriation and governmental surveillance. Facebook, for example, is a tool to share and communicate with your closest friends and family, but it constitutes one of the most extensive and detailed records of personal information ever collected about people. The disastrous political consequences of online disclosure have been demonstrated too many times in the last few years. Even when they pay lip service to privacy rights, corporations are in the business of making money and have with only with token resistance handed over private information about its users to governments out of fear of jeopardizing their bottom line.

Many of us know this already, and yet we continue to voluntarily subject ourselves to this pervasive scrutiny. Mark Andrejevic has referred to our knowing participation on networks of surveillance as the ideology of interactivity. It is personal self-disclosure as entertainment. Nineties’ webcams have become today’s social networks. The difference is that we no longer have a choice but to join these networks. They are tools that do not just enhance our ability to communicate with others, but have become integral to what constitutes human contact. To some, the fact that I do not post regular status updates on Facebook might imply that I do not have a complex social or emotional life, but to others, it simply means I do not exist. Our lives are the informational traces that we leave for others to browse.

We’d like to reflect further on details about the particular design of Security Gate 26.11, in particular, its detection of electromagnetic frequencies and the shift from analog to digital wireless transmission of information.

From an Electromagnetic Spectrum to Digital Presence

Access to information networks is increasingly done wirelessly (e.g. cellular networks and wifi), that is, transmitted via electromagnetic radiation. Since the explicit formulation of the laws of electromagnetism over a hundred and fifty years ago, scientists and thinkers have accepted the existence of electromagnetic fields as a natural phenomenon, despite the fact that they are not visible to the naked eye.

That is to say that the existence of electromagnetic fields is now acknowledged just as we accept the existence of atoms or stars.

The advent of digital signal processing has both abstracted information and also enabled a rapid expansion of the amount of data that can be wirelessly transmitted. Instead of analog's continuous signal, digital data is quantized and sent as discrete pulses; a signal, in effect, becomes independent of the medium in which it is transmitted and becomes simply information. Because data is abstracted in this way, digital signals are no longer legible in the same way as analog's modulation of frequencies. Each frequency can be used as a carrier of binary information, dramatically improving the capacity of electromagnetic waves to carry information. This change has facilitated the development of pervasive and always on wireless digital communication devices.

Conclusion

We are not in control of our digitally enhanced lives. We are unaccustomed to thinking about the informational traces we leave about ourselves. Many of us have yet to wake up to the realization of how extensive and pervasive our lives are subjected to constant monitoring through our use of communication technologies. Security Gate 26.11 renders visible the invisible information that we give off about ourselves. The Gate confronts us with our digital presence in the form of aural and visual feedback to the electromagnetic frequencies that we give off.

A second reading of this situation, already implied in this paper, is more pessimistic: we already recognize our predicament, yet we have no choice but to participate. In April of this year, for example, Apple was forced to admit that it collected and stored a year's worth of information about our physical location and movements, a database constituting a record of unprecedented micro-level surveillance. The public's shock at this revelation seemed disingenuous. That Apple was doing this wasn't at all surprising (it is well known that many of the electronic devices that we carry around in our pockets facilitate extensive monitoring), but the public, nevertheless, registered shock as a kind of toothless protest at the disclosure of this level of fine grained monitoring. Apple's response, that it needs to collect this information in order to provide the services we demand, is, to some degree, accurate. Heightened disciplinary monitoring is necessary for the functioning of pervasive and always on digital communication technologies.

In both these readings, the conclusion is the same: we have no choice but to participate and render our lives transparent to pervasive surveillance. Security Gate 26.11 brings to light the costs of our participation in digital networks by rendering visible these invisible mechanisms of discipline and control. The Gate demonstrates our voluntary participation in possible tyrannies of our own creation.

Short video of Security Gate 26.11: <http://bit.ly/q07SX8>

BODY GRAFFITI: EXPRESSIVE WEARABLE ART THROUGH BODILY PERFORMANCE

YOUNGHUI KIM

A wearable art itself can be an expressive media platform and when it is worn by a performer, it elevates expression of body language combining two forms of media that have been so close to art and technology - wearable and performance. This paper introduces “Body Graffiti”, a performance wearable art project that uses the illusion of POV (persistence of vision) technology to create ephemeral graffiti via bodily movement.



Fig 1. Body Graffiti Performance with B-Boy Crew, Last For One, HCI Korea 2010, Younghui Kim



Fig 2. Body Graffiti(Testing Prototype, hand sewn electronic circuit with LilyPad Arduino), 2009, Younghui Kim



Fig 3. Body Graffiti v.2, The Swing Boots, 2011, Younghui Kim

Introduction

Like many fine artists with technological background, modern & experimental dancers in the age of digital media have been early adopters of wearable technology. It seems obvious as the wearable itself can be an expressive media platform and at the same time, worn by a performer, it elevates expression of body language as creating a stronger media platform combining two forms of media that have been so close to art and technology - wearable and performance. This paper introduces “Body Graffiti”, a performance wearable art project that uses the illusion of POV (persistence of vision) technology to create ephemeral graffiti via bodily movement. The artist creates and utilizes this newly developed wearable platform in order to express and communicate her contextual messages and suggests the significance of creating a “wearing” technology art project by presenting the creative development process, as well as future variations of “Body Graffiti.”

Background

About a few decades ago when wearable technology was introduced as a new form of human-computer interaction, a small group of media artists with technology background paid a great attention to it as a new form of expressive media to explore. Today, wearable technology has become more accessible to designers and artists and wearable has become a new subject of research for its abilities to transform physical interface of information technology into clothes to wear. While they were in search for innovative new flexible technology solutions, many found out that wearable computing facilitates a new form of human-computer interaction because the user can compute by one's body while wearing it. Furthermore, interaction can be operated by simple bodily gestures or its surrounding elements such as noises, temperature and WIFI signals while walking or doing various activities.

There have been great interests by artists in wearable as a form of new media art since it brought out innovative significance in communicative art. Especially in interactive dance or performance like N.I.M.E. (New Interface for Musical Expression) artists can take full advantage of expressive choreographies of wearable technology media. Diverse experimental wearable projects have been showcased at the international exhibitions like ACM SIGGRAPH Cyber Fashion Shows, FutureFashion Event, Seamless, Social Fabrics and more during 2000s.

At a glance, Interactive wearable computing seems to be a natural adaptation of physical computing as clothing is ubiquitous with physical interface. In a comparison with portable devices like mobile phones, one can see obvious behavioral difference between being 'wearable' and 'portable.' The computer being wearable introduces drastic changes in how we communicate and compute. Further more, fashioning element enhanced with interactive technology creates a new form of computing media that is more responsive and expressive for both creators and wearers. This shows that not only wearable media brings the new condition of wearing an actual computer on body but it also introduces significant changes in ways a user computes using one's body whether its a gesture or a temperature body emits. Therefore wearable art can be investigated for being a powerful means for expressionism of everyday life activities and performances through interaction.

Body Graffiti

The "Body Graffiti" projects started with a simple idea for a new performable digital media public art that doesn't require a stage set or a big screen in urban streets. Performers like B-boys(Breaking dancers) are originated from street art scene just like graffiti artists, and they can be defined as public art performers. There is no simple definition of street art yet, here is how the online publication; Art Radar Asia defines 'street art'.

With anti-capitalist and rebellious undertones, it is a democratic form of popular public art probably best understood by seeing it in situ. It is not limited to the gallery nor easily collected or possessed by those who may turn art into a trophy. Considered by some a nuisance, for others street art is a tool for communicating views of dissent, asking difficult questions and expressing political concerns. [1]

Graffiti arts are drawn in urban public space to communicate messages whether they mean political or not. You can find tap dancers or b-boys in public streets or parks in urban cities like Seoul or New York City, performing outside of structured theatrical environments. Combining elements of strong graphic message with the street performing art, the POV driven technological platform for "Body Graffiti" was invented in a wearable format using basic electronic technology with a microcontroller embedded hardware, Arduino. [2]

Observing the performers like B-boys who express in their fierce body language, the idea of enhancing their bodily expression using wearable media reacting to their dancing motion, was conceived in 2007 when the artist moved to Seoul to teach and research further in interactive art. She had been looking for new collaborators to experiment POV technology on wearable costume for dancers to test on POV displays with their movements.

In 2009, the WCU Digital Media Public Art Research Lab [3] was founded with a support by the Ministry of Education, Science and Technology through the National Research Foundation of Korea. As a participating researcher, the artist was able to develop the newest prototype of "Body Graffiti" wearable project.

The wearable project requires to be designed with a great knowledge in both art and technology combined. Thus, it requires a long process of researching in various materials and technologies as well as developing an actual working prototype in a breadboard and then, clothing. Especially for dance performances, the wearable garments had to be comfortable and durable from fierce bodily movement. Additionally, unlike of the other physical computing applications such as installations and interactive objects, wearable computing applications force artists to de-construct the conventional 2-dimensional electronic circuit system and rewire into a flexible 3-dimensional electronic circuit system transforming it to be integrated seamlessly into soft clothing design with strong wearability. [4]

The Body Graffiti for the b-boy performance had been an on-going collaborative project from beginning. There had been multiple prototypes of "Body Graffiti" in collaboration with the world champion b-boy crew, 'Last for One. In this performance wearable project, the artist tested the POV system interacting with specific dancer's movement with a couple of small testing prototypes first.

POV, Persistence Of Vision is the phenomenon of the eye by which an afterimage is thought to persist for approximately one twenty-fifth of a second on the retina. A common application is a flipbook animation. POV display is a technology that composes an image by displaying one spatial portion at a time in rapid succession (for example, one column of pixels every few milliseconds). In the project, "Body Graffiti" has used 2D POV display technology accomplished by means of rapidly moving a single row of LEDs along a linear or circular path. The viewer can perceive the image as a whole as long as the entire path is completed during the visual persistence time of the human eye. A further effect is often to give the illusion of the image floating in mid-air. [5]

With a technical collaboration from the fellow researcher, Dan Mikesell, the artist made a jump rope using 8 LED pixels at first. The POV image was somewhat recognizable in bare eyes during the jump rope swings so, she moved to the next version using a LilyPad Arduino with 16 smaller red LED pixels and hand-sew the whole circuit using 2-ply conductive thread. When wearable computing projects are involved, the LilyPad Arduino, designed by the Sparklab [6] and Leah Beachley, [7] conductive thread or fabrics, metallic connectors like snap buttons, and light batteries are common ingredients. The second small prototype was sewn into a pair of sneakers where LEDs were embedded on the outer layer. However, after the first meeting and rehearsal with the b-boy team, it was soon realized that POV display on the sneakers limits the visibility of the graffiti message because of the breaking dancers' certain angle of movements.

The next sewn circuits with an LilyPad Arduino was purposely made on the small pieces of fabric in order to attach on different spots on the performer's body since wearable has to be designed according to dancer's speed and angle of movements; rotation such as head-spin in the case of break dance. After test-rehearsals with two b-boy dancers who specialize 'head spin' technique, the research team soon found the best suitable spots on the dancers' bodies to perform "Body Graffiti" – chest, back and from ankle to knee part of both sides of legs.

Once wearable forms are decided to be a vest and a pair of leg shields for the better visibility of graphic and textual message to be conveyed, the whole new system was developed quickly. The new system

was built with the custom PCB (Printed Circuit Board) where electronic parts were hand soldered to control 32 LEDs with an Arduino Nano. The electronic circuit and software had to be redesigned and reconfigured to support more number of LED pixels. With this new system, the very first finished version of "Body Graffiti" was developed successfully and performed during HCI Korea 2010. [8]

During the performance, two main b-boy dancers wore the Body Graffiti system embedded in the vests and leg shields and expressed visual graffiti drawn in air, with their body movements. As b-boy dancers perform head spins, windmills and flares, messages programmed in the custom designed LED POV system was displayed. The visual messages for the HCI Korea 2010 performance were graphical icons like a pointing finger and a heart beat with words such as – 'HCI 2010', 'Open Creativity', '창조', a noun meaning 'creativity' in Korean, to emphasize the main theme of the HCI event, "Open Creativity". Therefore, one can say that the performance of the Last For One dancers wearing the "Body Graffiti" was meaningful for its collaborative and creative effort.

Future Projects

The "Body Graffiti" art projects continued to evolve in both contextually and esthetically after the performance with the b-boys. First, the system has been upgraded with more defined custom PCB design that has become thinner and more flexible with the doubled resolution of a vertical column of 64 LED pixels, where more detailed images can be displayed in the POV display. Also, newly designed PCB has become modular, so that each unit of 8 LEDs can be added up to 64 LEDs when connected together. Each unit can be connected with electronic wire or conductive thread through the connecting sewing holes on the PCB modules, in order to construct the electronic parts into a flexible wearable piece and also to fit better with 3-dimensional shape of human body.

The design variations of the "Body Graffiti" interface have been an on-going exploration. The second variation with the newly upgraded electric circuit system has become a pair of black boots with a column of 64 LEDs each, titled "Body Graffiti, The Swing Boots." The wearer can perform the POV graffiti display on the swing set like one that you see in the playground, or just swing her legs back and forth fast to display POV message. Contextually, it is still in an experimenting stage for the swing boots wearable project. During the exhibition at DALSMA 2011, an exit sign graphic following with a text of "RUN" was performed while swinging the boots. [9] On a swing set, the swinger wore the boots to display the POV graffiti images of a pair of wings on both legs along with a word, 'FLY.' One could imagine, when the "Body Graffiti" swing boots are made in multiple numbers, the wearers could be marching in a formation to demonstrate certain textual messages in public space as an urban performance.

For the newest variation of "Body Graffiti", the context of exchanging meaningful message matters heavily. The audience would catch the moment of movements of lights and remains of its prior existence; the existence of the brief visual text message created by blinking LEDs a brief moment ago. In this version, it is not actually a wearable for the performer but multiple numbers of objects that anyone can perform to throw – they are the "Body Graffiti" Frisbees, working titled as "Throw & Catch (Words)." Each disc will display two words when it is thrown up in the air to be caught. Words are carefully programmed and embedded into the "Body Graffiti" POV platform system by the artist. This project is to demonstrate the physical form of communication through bodily movement, throwing and catching certain words that briefly exist. The project, "Throw & Catch (Words)," was displayed, and performed at the Tukksom Han River public park in Seoul, Korea on the 21st of August, 2011 as a part of a group exhibition titled, "Media Circu(it)s." There were about twelve "Body Graffiti" discs laid out on the grass near

Han River and the public was invited to participate in throwing words around in the evening. The different texts in Korean meaning such as 'I'm better than you', 'I don't want to', 'I envy you' were POV displayed for participants to experience communicating in physical action of throwing and catching the briefly existing textual words that are commonly uneasy to speak out within Korean society, where this art project was exhibited. This new version is to be developed further in different languages in close future.

Conclusion

'As a wearable communication platform, an electronic textile functions as a dynamic surface around the body that interconnects people and places.' [10] Often, wearable artists take great deals in displaying since the surface of the garment easily becomes visual interface to communicate. Lights are common form of visual expression in wearable technologies since it's easy to control their patterns and movements with micro-controllers.

In some sense, "Body Graffiti" performance with the b-boy crew, "Last For One" was a true form of hybrid art and collaborative creation among dancers and wearable art technology researchers. Like other performing wearable musical interfaces and/or real-time moving images that interact with wearable on performers, it reflects how performing art can be an ideal platform for the wearable media as it provides creative expression for both wearable artist and performers.

The fact that messages for the "Body Graffiti" projects can be reprogrammed easily through the software developed in Processing and Arduino makes "Body Graffiti" a wearable platform. The project wasn't originally created with a functionality of a wearable in mind. Rather, this new wearable display platform was created in the process of exploring context of words and graphic messages displayed through bodily movements of the wearer. Very often, new media artists have to create or reinvent a new technological platform in order to express in new ways and this was the case for the project, "Body Graffiti." Additionally, very expressive ability of the platform opened up new opportunities of creating many different variations of the "Body Graffiti" projects as a result.

"Body Graffiti" isn't just a new wearable platform. It is a statement the wearable creates through performer's bodily movement and the artist's conscious messages combined. Its fast movement and transformation leaves a brief story while blurring its surroundings for its audiences.

ACKNOWLEDGMENTS

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RETHINKING THE BASELINE: EXPLORATIONS IN NONLINEAR TYPOGRAPHY

Travis Kirton

Rethinking The Baseline is an ongoing investigation into the possibility of non-linear typesetting through the production of original artistic software and exhibited artworks, which challenge fundamental concepts in the field of typography. Two digital canvases are presented, called TextDraw and Typels, where the artist can draw with text using nonlinear and gestural interaction to control and create new kinds of typographic aesthetic.



Fig 1. *The Don's Imagination*, 2009, Travis Kirton, Handmade Typographic Artwork / Print made with Typels, 1.80m x 1.0m containing 450,000 letters.



Fig 2. *Drawing with Type*. Putting pressure on the pen changes the size of each letter as it is being drawn, tilting the pen changes opacity, and drawing direction affects rotation.



Fig 3. Baselines (in red). Traditional baseline (above) is an invisible staff which appears after letters have been typeset. Weighted baseline (below) is an object made of points which determine the characteristics of the letters on the line.

Aspects of modern typography that were defined around the time Gutenberg's press was presented to the world have come to be deeply rooted in daily perception. We take for granted the way words should be read, how text should be prepared and presented, to such a degree that "good" typography should often become transparent. This level of achievement has come through centuries of development, and many theories for working with text have stood the test of time. The work presented herein does not challenge the beauty of a letter, the aesthetic qualities of an optical kern value, nor the gestalt effects and theories which were studied and concretized throughout the better part of the 20th century.

What this work suggests, however, is that the digitization of the typesetter's workshop brought with it strict and rigid principles that belong within the realm of materials. For instance, principle of "leading" refers directly to the use of lead as a medium for creating space between lines of text. Beyond this, however, the remediation of typesetting also brought with it a methodological and linear process of working with words. A process whereby the act of placing one letter after another, of moving one block of text, changing characteristics of letters, and so on, happens in a step-by-step fashion. Furthermore, the abstraction from metal type and typesets to the mouse, screen and keyboard, effectively abolished the physical nature of typography. No more do the typesetter's hands get dirty during the creation of a new work.

The direct translation of typesetting techniques to the computer was a necessary first step. Now as new forms of technology are arising, computational devices are becoming faster, and physical interfaces are moving away from the keyboard and mouse, it is the right time to start thinking about the next stage of typesetting. This work attempts to do just that. The confluence of digital typesetting, computation as a medium for artistic expression, and the advent of graspable and tangible interfaces creates an incredibly interesting and open space for the field of typography.

MOTIVATION

My goal is to develop new mechanisms that help us *rethink* our relationship to things we take for granted, and which can provide a foundation for the development of innovative approaches and new space for creative expression. At the moment, my work looks at a limitation in modern typesetting environments which shapes the practice of typesetting into a linear one. Through my research I have come to see this limitation as a by-product of design for keyboard and mouse interaction.

I share in the belief that this linearity occurs as many elements of digital typesetting environments have been developed as general remediations of printing press techniques. [1] In response to this, I have created a new kind of canvas for working with type using non-linear techniques, where many aspects of a letter, word or phrase can be controlled and manipulated simultaneously.

My technical approach finds its roots in two places: the use of computation as a medium for creativity, and the development of physical interfaces for high-fidelity interaction with software environments. The former can be seen in the work of contemporary computational artists who develop their own programming languages, writing software through which they are able to express their unique visions. [1,2,3,4] The latter can be seen in the development of Tangible and Graspable Interfaces which provide more natural affordances for control and interaction than the keyboard and mouse.

Such kinds of interaction have been successfully applied to gaming, music, storytelling, and other computationally enhanced environments, but remain largely unexplored in the field of typography. [5,6,7,8] I am interested in developing new kinds of software / hardware interfaces as opportunities for returning to the field of typography, a physical quality that was lost when print moved to the screen.

GESTURAL & NONLINEAR TYPOGRAPHY

Over the course of the last two years I have been engaged in a media-art research project centered around the idea that smart interactive surfaces can help us rediscover and rethink paradigms that we take for granted in our everyday lives. Throughout this period I developed two applications, called TextDraw and Typels, which exemplify the possibility for non-linear typesetting through original artistic software. As well, I used these applications to produce and exhibit artworks that support a challenge to fundamental concepts in the field of typography. Furthermore, both of these applications utilize elements that separate them from modern commercial typesetting software.

The act of creating, or even simply attempting to create, new mechanisms for production opens up an opportunity to deeply investigate the nature of a field such as Typography. In order to build something new one must first understand the elements needed for its construction. In the past, such elements were almost entirely material, or physical objects and processes – before being able to punch-cut moulds for casting type, an understanding of physical properties of metal alloys was essential. In today's digital world such elements can fall entirely within the realm of the intangible – creating new applications for typesetting requires a working knowledge of available underlying software frameworks. Both cases necessitate a thorough understanding of the qualities of the materials with which one can create.

The production of TextDraw and Typels has helped validate two fundamental assumptions about the field of typography. Despite the potential for digitization to untether typesetting practices from their

historical precedents, the act of typesetting remains inherently linear. This linearity is strongly influenced by the tools and materials with which typographers are able to accomplish their practice. Additionally, since the introduction of new forms of media and techniques in the mid-60s, of which software plays an important role, the physical nature of the practice of typesetting has been largely lost.

The first application, TextDraw, addressed the linearity and lack of physicality present in modern typography. It did so by considering the impact of new technologies on the ability to provide a paradigmatic shift towards non-linear control over typesetting environments. TextDraw is designed to be used with a stylus that can capture such things as pressure, location, tilt and rotation. These aspects provide the basis for capturing a variety of movements and hand positions which can be used as gestural input for typesetting. In doing so, TextDraw attempts to do so by bringing back elements of lost physicality, through the creation of gestural interfaces which provide higher degrees of expressivity than the traditional keyboard and mouse. [9]

GESTURAL TYPESETTING IN TEXTDRAW

In typography, the baseline is an implicit element used for measuring the vertical placement of text, which Bringhurst describes as an invisible line “on which [most] letters rest.”[10] The baseline is an implicit element because it only appears as a result of typesetting, and is not a real object in the sense that it can be changed. In software, however, the baseline is an explicit object that contains letters.

Creating baseline itself as an explicit object, which provides the basis for defining text attributes, is a different approach than the one taken by modern typesetting softwares. Essentially, in abstracting attributes away from individual letters I am attempting to shift the idea of the baseline from an imaginary entity to one that is also responsible for creating the look, position and feel of text itself. Rather than the baseline arising from the visual composition of text, it is the visual composition of text that arises from the creation of the baseline.

In TextDraw, gestural interaction is captured and stored in a set of weighted points which contain position, rotation, pressure and tilt information. When a path is created, by drawing a line into the application’s canvas, it takes a section of text and attributes each letter based on its position along the line. As each letter’s attributes are determined, those attributes help determine the position and attributes of the following letter. Specifically, the attributes for every letter in a line are dependent on that letter’s distance from the beginning of the line, with its distance being dependent on all the letters which precede it along the line.

Modern typesetting software breaks bodies of text down into lines, and then into runs of characters. These runs are essentially sets of sequential letters which have the same attributes (e.g. point size, font, italic). In TextDraw, it is uncommon for individual characters to be lumped into the structure of a run because the fluid and intuitive nature of gestural typesetting often provides subtle variations in attributes from one character to the next. Because of this, it is the attributes of each individual letter are determined by its distance from the beginning of the line on which it is being drawn. Furthermore, because each letter’s distance determines its attributes the concept of a run of letters having common characteristics becomes obsolete. In general, the reason for this obsolescence comes not from the technique of gestural typesetting but from something more fundamental.

The principle behind the idea that text can be broken down into lines, and then into runs of characters, which all fit within shapes and areas in a typographic composition presupposes something crucial. The metaphor behind the construction of a basic run of characters supposes that all characters will be consecutively laid out on a line. This is an important point, and fundamental to this work because this approach assumes that the traditional concept of an implicit baseline as a horizontal or vertical element is the most appropriate form for typesetting in a digital context.

Having created TextDraw, I took a 6 month hiatus from developing to focus solely on working *with* the application, rather than *on* it. I was able to “draw” with type, but wasn’t really sure what that implied. So, I started exploring the differences between inked lines and lines of text. Working solely in black and white for this period, I produced a series of works whose aesthetics were largely based on versions of various woodcut prints by Gustave Doré. I was able to trace lines using my pen’s pressure sensitivity to smoothly adjust the size of each letter as I was drawing.

Afterwards, I experimented with shading and the qualitative aspect of using text as texture, subtle adjustments to the tilt of my pen changed the opacity of each letter. The product of these experiments were the Alice in Avenir series, where I combined chapters of Alice in Wonderland with images from its original publication. Through this period of creative work I learned much about the artistic experience of gestural typesetting. However, I felt that the process of creating works with TextDraw remained inherently linear because the application only moved through a text one letter at a time. To move beyond this I needed to develop a system which would handle moving through a text in non-linear fashion.

NON-LINEARITY IN TYPEIS

Naturally, the technique of gestural typesetting is a non-linear one and requires more than a straightforward, linear access to the text which is being drawn. In order to accommodate this, a novel line management and text storage system was designed into the new application. Among many advantages, including efficient storage and access, Typels provides non-linear access to various components of a body of text. When a body of text is loaded into the application, it is broken up into a set of component strings, each of which can be accessed individually. Even though the current implementation uses a pen-based interface and draws a single line at a time, it is possible to access multiple components of a text simultaneously. In a simple experiment, a bit of modification to the user interface resulted in a multitouch version of Typels where each finger is drawing words from different parts of a text.

Just as I stopped developing and started working creatively with TextDraw, I picked up my stylus and spent again a period of months experimenting with Typels. Throughout this period I moved beyond black and white experiments to a range of works in colour. With the sophistication of new system, I was also able to create interactive installations and 3D-printed type sculptures. During this period I also collaborated with the choreographer Joan Karlen to produce dynamic poetic aesthetics for the ballet Trace.

RETHINKING THE BASELINE

Represented in these two applications is a fundamentally new way of constructing typographic works. This new way can be seen as the result of using a new kind of mechanism, a weighted baseline, a software object which attributes characteristics to letterforms. This mechanism provides the ability for

recording multiple forms of input which provides the opportunity for non-linear control over the aesthetics of a piece. The non-linearity which is possible through the use of this baseline is supported by another mechanism which provides non-linear access to all the elements of a given text. The weighted baseline shifts the typesetter's traditional practice of editing characters and words to manipulating the elements of a typographic environment.

Typels attempts a first, though small, step towards bringing physicality back to the practice of typography through the use of gestural interaction. An overall vision, and motivation for the work, sees the development of tangible interfaces for typography where the typographer can once again actually touch and control the tools needed for typesetting.

Rethinking The Baseline implies that its purpose is to investigate modern typesetting and to propose new inventions where old mechanisms may have reached their potential. It suggests, too, that new technologies provide the starting point for reconsidering paradigms that are taken for granted in our daily lives. Finally, and most practically, it elucidates the fact that the creation of gestural and non-linear typesetting environments require the invention of a new kind of baseline.

In traditional typesetting the baseline is an abstract idea, an ephemeral line which appears only after letters have been aligned to one another. In TextDraw and Typels, the baseline has become an object that the typographer can mould and create through gestural and non-linear interaction. A new object, which becomes central to the creation of artistic works, provides the starting point for rethinking established ideas and paradigms of thought. In a synthetic media-art-research practice, new mechanisms provide the opportunity for the creation of new aesthetics, and new kinds of expressive activity create the space for the development of practical innovation.

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CROSSWORLDS

OLGA KISSELEVA

Products of the theory of error correcting codes, electronic tags correct transmission errors, exploit informational redundancy, flirt with order, disorder, and the entropy of information: in *CrossWorlds*, the artistic proposal integrates the concepts of a scientific corpus born post-war under the impetus of Claude Shannon. A true dialogue between art and science is presented here.



Fig 1. Olga Kisseleva decoding a 'CrossWorld' with a mobile phone, 2010



Fig 2. "Olga Kisseleva 'Have you enrolled as a volunteer?' from the CrossWorlds series, 2008

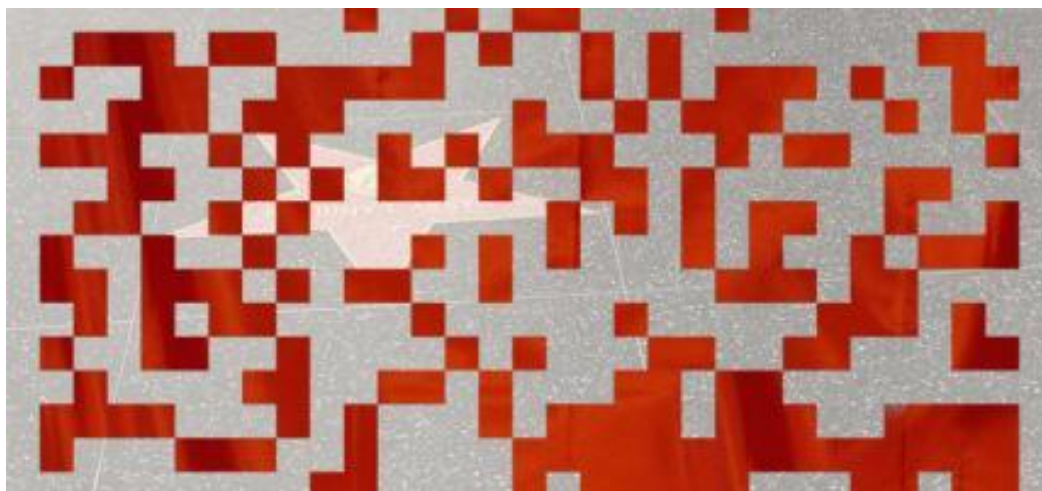


Fig 3. Olga Kisseleva 'Towards the collective' from the CrossWorlds series, 2008

The advent of the digital communication systems at the end of the '90s generated a major change in society. It is undeniable that this technological revolution profoundly modified the structuring of relationships between individuals on the one hand, and between the individual and the collective (e.g., governments, large companies,...) on the other. Using this fact as a kind of anchorage point, I have implemented an original collaboration between art and science, proposing an innovative development as regards a collaboration between artists and scientific laboratory.

My way of working follows an experimental approach: a discrepancy, detected during a process or in the operation of a structure, leads her to formulate a hypothesis, explaining the observation in question, and as far as possible, to propose a solution to the problem. To do so, she identifies the skills required to carry out the studies and pilots the research. I call upon the exact sciences, on genetic biology, geophysics, or political and social science. I carry out the experiments, calculations and analyses, strictly respecting the methods of the scientific discipline concerned. My artistic hypothesis is thus checked and approved with a strictly scientific method.

CROSSWORLDS: CONCEPT AND OPERATION

CrossWorlds is presented in the form of a series of electronic tags printed on formica.

This artwork was produced in the context of Transmediale, the theme of which for 2008 was “Conspire”: hidden intentions, hidden messages, hidden things... The piece was created in situ at HKW, Berlin (Das Haus der Kulturen der Welt - the House World Cultures).

When entering this place for the first time, one can feel an atmosphere similar to that of the Soviet culture palaces of the Seventies (time when I, then a schoolgirl and member of the Communist youth, had piano and ballet lessons in this type of institution). However, the HKW is not a product of East Berlin. This famous building was offered by the Americans to the town of Berlin as a sign of friendship in the

Fifties, “to mark”, to some extent, their territory. As such, slogans of American propaganda were engraved on the walls of the building - in the figurative sense - as testimony of United States supremacy. What is surprising is that this building is similar to those which the Soviets were simultaneously building on the other side of the Berlin Wall.

I was particularly interested in this point, which led me to explore questions related to the similarity between the cultures of the Eastern and Western Blocs at that time.

ELECTRONIC TAGS: FROM FUNDAMENTAL PHYSICS TO THE TECHNOLOGICAL OBJECT

The electronic tags I use are semacodes, the two-dimensional modern version of the barcodes of the Eighties. Barcodes are omnipresent in the labeling of products or objects (hypermarkets, libraries,...), and are primarily used to ensure the traceability of goods. They are made up of a succession of black bars, the variable thickness of which represents respectively an 0 or a 1. They are, however, more than just a simple technique for the storage of digital information. Barcodes (like the majority of visual codes) are robust in relation to error: they contain informational redundancy, i.e., they contain more information than necessary in order to be able to correct possible misreadings thanks to this additional information (for example, if a bar is not easily readable, with weak contrast, and its thickness is consequently difficult to estimate). Each code has its own performance, which makes it possible to recover original information more or less effectively according to the level of error present.

A datamatrix is a two-dimensional version of a barcode. It's a square of a few square centimetres, made up of juxtaposed black or white pixels (or squares), respectively coding a 0 and a 1. They first appeared in Japan in the Nineties, and were rapidly adopted by the Japanese industry due to their high storage capacity on a very small surface (in particular their capacity to code the kanji of the Japanese language). They are also error correctors: if a zone of the square is blurred, or the level of contrast is weak, and the reading of certain pixels is therefore difficult, the informational redundancy is sufficient to recover the original information as long as the blurred zone is not too large.

The choice of the semacodes (a variant of the datamatrix) for the fundamental base of the work is also an aesthetic choice. The pictogram, which can contain up to 4000 characters, offers a sybilian, cryptic aspect to the eye, which also intrigues one because it is omnipresent in contemporary society, and yet indecipherable without the help of an electronic machine.

In as much as they are error correctors, the barcodes are de facto products of an obsession with security (food or medical safety,...) which increased throughout the Eighties and Nineties and was nourished by our society's growing intolerance of error, and somewhat ambiguous conception of risk (rendered positive when it's associated to innovation and the entrepreneurial, and deplored when it flirts with death - aeroplane accidents, medical errors,...).

The principle of error correcting by redundancy was formalised by Claude Shannon at the end of the Forties in his article “A Mathematical Theory of Communication”. Humans have their own mechanism of redundancy which enables them to communicate even under difficult conditions of transmission (ambient noise,...) for a long time: either quite simply by repeating the same sentence several times (collation mechanism), or by adding information another way (gestural), or finally by using contextualisation to decode the information (a word's missing in a sentence, but the context enables us to guess what it is).

In this last case, it's our culture, and our language, which enables us to recover information by contextualisation.

Semacodes are displayable as a two-dimensional matrix of black or white pixels. The visual analogy between semacodes and spins (models from quantum physics, like the Potts or Ising model, and intended in particular for magnetic materials) led me to explore the conceptual similarities between the physical model of spin networks (which has been studied for several decades, and which constitutes the paradigm of statistical physics) and the eminently contemporary technological object that is the semacode, further.

ELECTRONIC TAGS: THE ARTISTIC APPROACH AND THE TECHNOLOGICAL OBJECT

As an artist, I became interested in electronic tags for two reasons. The first approach was formal: she found this geometric form composed of small squares, enthralling from an aesthetic and a semiological point of view. The duality is present in each tag: black/white, dark/light, zero/one. Each time, the tag is like a path to be found in a maze, an enigma to be solved, a truth to be defined. I was seduced above all by the positive Cartesian side of these objects.

But, if the tags have a tempting appearance, from a social or political point of view they also have an alarming dimension. Often invisible, due to their small size, they are omnipresent in the urban landscape, public and private spaces, in the underground, on advertising posters, magazine covers... They differ from the barcodes that one finds on products for sale in supermarkets, in that semacodes are decipherable with a simple mobile phone equipped with a camera and necessary decoding programme (rather than a sweeping laser scanner). Once decoded, the message "enters" the telephone.

All kinds of messages can be adapted to tag technology: simple texts, or more complicated informational structures, such as an Internet address (URL), a hypermessage (sound, image or video), even an order which the telephone will carry out. In practice, when one goes past an advertising poster in the underground with one's telephone on and directed towards the poster, a message "jumps" automatically into one's telephone, inviting one to connect onto the site of the mark in question and buy the latest promotions or the latest models of the range. All one has to do is click on "OK".

We are, in fact, becoming increasingly manipulated by this technology. We have less and less choice: it's binary, between clicking on "OK", and not clicking. All the rest has already been prepared, the path has been paved.

I first came across electronic tags in 2006 during my exhibition at the Guggenheim museum in Bilbao. The project introduced the urban signalling used by people with a minor mental handicap to move around the city, into the museum territory. In several parts of the town of Bilbao where difficulties of displacement or orientation could arise (bus, street, crossing, etc...), electronic tags were present to help them by bringing them the necessary information. The handicapped were to some extent radio-controlled through the city by such tags. It was surprising to note how the handicapped people recovered the faculties of "normal" people thanks to this technology. And in fact, the non-handicapped people became almost handicapped by being inordinately assisted by this multi-media technology.

Obviously, it echoed Soviet propaganda technology used in the USSR, which hammered slogans from dawn to dusk, in nurseries, factories, and at home, that one should adhere to, such as: "do not stray

from the collective”, “love your fatherland”, “every day the lives of the Soviet people are increasingly happy.” One realised in the USSR that another kind of propaganda was being hammered on the other side of the iron curtain, but with a different set of values. When one looks more closely at the slogans of American propaganda, one realises to what extent they are close to Soviet propaganda (in particular when translating Soviet slogans into English, one can see how the same words are used). For example the very Soviet “the dreams of the people come true” is astonishingly close to the American “what the people believe is true”.

Each tag is composed of two images: one from Soviet propaganda, the other from American propaganda. Each time, one of the images plays on the black, the other on the white, and together they make up one of the slogans, Soviet or American. When looking at them, one can note a real similarity between the two images, for example between the faces of the Ukrainian dancers, and the faces of Hollywood actress, or more specifically, between Marilyn Monroe's face and that of Lubov Orlova (Russian actress who was the star in all Soviet films at the same time); one is under the impression that it's the same face. When one presents these two images to Western spectators, they think it's Marilyn Monroe's face shown twice. But it is not only a question of faces, but also of common symbols: in one of the tags one can see the red flag brush with a fragment of the floor in the Hall of Famed in Hollywood, with the same stars in the shape of a star personality.

INTERACTIVE INSTALLATION

An interactive CrossWorlds was produced in collaboration with quantum physics laboratory.

By inventing a computer programme which produces semacodes on the go when connected to the Internet, I wanted to divert the semacode from its primary technological function. The programme generates semacodes the original white and black electronic tag pixels of which change colour at regular intervals to ones which remind one of the “flashy” look related to the disco music period at the start of the '80s. This aesthetic choice is not random. The period also symbolizes the advent of perestroika and the East-West detente, and when the Berlin Wall were omnipresent in the political and artistic discourse in the West.

A true semacode does not fluctuate, the pixels do not change colour, the black/white opposition is thus disturbed here by an absurd colour setting, which doesn't contribute anything to the informational level, and even blurs the tag by reducing its contrast. The colour setting, in addition, is random; the choice of colour is produced randomly from a pallet of sixteen colours chosen for their saturated aspect. It is, in fact, a perfectly reproducible chance process, created by a computer program called “pseudo-random generator” which produces in a deterministic way, i.e., predictable and reproducible, a succession of numbers between 1 and 16 which have no apparent correlation between them. This absence of correlation is what makes the succession of numbers seemingly unpredictable, and therefore fittingly random. Following the example of radio operators used by the intelligence services of the former Eastern Bloc to jam and prevent the reception of television programmes produced by Western tv channels, these semacodes jam and thus access to the political message contained in the tag is more difficult. The exhibition visitor, provided with his or her mobile phone and an ad hoc decoding software, is therefore sometimes surprised that he or she cannot decode the message if chance happens to contribute to the situation by significantly modifying a majority of pixels.

CONCLUSION: ART&SCIENCE BASED WORK AS A NEW PERSPECTIVE OF CONTEMPORARY ART

The last two centuries have shown how much researchers, engineers, and scientists have had the capacity to change in the society in which they live, and which they've exerted via a process generally consisting of creating a filament (a new theory, technological invention), or suspending themselves from an existing filament and creating more or less rebellious ramifications of it. The researcher cannot not be responsible. The desire to address such a responsibility becomes more and more pressing over the process of his or her process of maturity.

Art&Science approach concentrates on destabilizing, and taking a certain amount of distance from, the daily practice of research, while taking a fresh look at past work; at the sensitive, laughable or provocative dimensions of the work, which are also fundamental, in that they can constitute a catharsis.

By analysing scientific theories since the second world war, it appeared to me that the theory of information was probably the most disturbing, stimulating, shocking and destabilising to have appeared in the 20th century. In the ultradigitalised information and knowledge-based society, in which the desire for hypercommunication is the rule, it seemed essential to us to propose that one reflect on the significance of this communication and on the structuring of the information implied within it. For the researcher, there is, naturally, a quest for meaning related to the societal implications of his or her work.

Art&Science research upheld by CrossWorlds, and the firmly interdisciplinary character of this approach, has enabled me to provide a resonance to this work that is scientific, aesthetic and political. CrossWorlds has quite naturally given rise to the concept of informational resilience: resistance to censure, propaganda or truncated information, the fundamental role played by the redundancy in this resistance, multiplicity of channels of access to the information, intransigence to error or to jamming. Such key points will be refined, disclaimed, and put to the test, in future work.

INFRA|VERGENCE

Brad Kligerman, Jamil Mehdaoui & Sinan Mansuroglu

Immersive visualization reveal the dynamic form of communication and transportation infrastructures as it facilitates the simultaneous occupation of digital and physical worlds across, online server, virtual worlds, and physical space. A visualization of the metaverse's sustaining infrastructure emerge by mapping its form, structure, scale and extents based on usage data flowing through it, focusing on their divergent/convergent qualities.



(E)Space, immersive visualisation by Bradley Kligerman and Jamil Mehdaoui (Building W/Immaterials

The project's objective is to employ immersive visualizations to map the dynamic form of the Metaverse. This will be achieved by creating a representation of its network infrastructures, the multitude of communication and transportation networks that span between its digital & physical states, from : online social spaces, 3-D immersive worlds, geospatial worlds and the physical world.

infra|vergence is a research/project into how to map the scale & extents of the metaverse based on passively capturing network data flowing through this complex infrastructural nexus.

infra|vergence is also a project/research. By focusing on the divergent/convergent qualities of the metaverse, a visualization will emerge showing not only a quantitative representation of this network, but also an expression of its qualities.

This presentation will be illustrated by referring to other projects that have been created for the metaverse.

Key Concepts

We will begin by establishing a common definition of the METaverse to help avoid ambiguity and to determine the scope of this project.

metaverse : We define METaverse as the collective, consensual space created from the convergence of digitally enhanced physical reality and physically persistent virtual and online worlds. The METaverse is composed of the sum of all virtual worlds, augmented realities and network enabled services for communication, collaboration and location.

components of the metaverse

1. Virtual worlds : A virtual world is synchronous, persistent network of people (represented as avatars) interacting in a physically coherent spatial environment that is rendered by networked computers.
2. A user is considered INWORLD when he/she is active in a specific virtual world.
3. Metaverse Roadmap (Smart, Cascio & Jerry Paffendorf, 2007) : "the convergence of virtually enhanced physical reality and physically persistent virtual space." In fact, it is a fusion of both, while allowing users to experience it as either.
4. This last point is essential. "allowing users to experience it as either" implies that, whether INWORLD or not, one can be constantly engaged or co-present, with the metaverse, constantly in contact with it through social media or geospatial worlds. This hypothesis is essential to how we collect our data.
5. mirror worlds : informationally -enhanced "reflections" of the physical world, creating a service used for real world orientation and navigation, for example Google earth
6. augmented reality : exists through the use of technical interfaces, such as mobile computing devices, to enhance the external physical world by superposing location-aware information on top of our everyday perception of the world
7. all of these components of the metaverse overlap and converge to fabricate an immersive, albeit fragmented, experience for consensual users.

FRAMEWORK

The essential support structure of this project (its framework) is the technical infrastructure, the persistent data networks, and the social constructs emerging from them.

Due to the complexity of these divergent and convergent infrastructures, their simple classification transcends of any one of them. For example : information infrastructures (making possible global communication) are augmented by transportation infrastructures (enabling mobility) to compose dynamic urban environments; financial infrastructure are magnified by legal systems to define market economies; supply chains are brought into focus by energy infrastructures to determine the patterns of territorial occupation...

An infrastructure can be represented as a function of the quantity and quality of the data that circulates through it.

ACCELERATOR

In addition to infra|vergence's stated objective to Map the Metaverse, we are committed to carrying out research concerning metaverse ecosystems. These include addressing innovation in the design and building of immersive 3D environments and the unique media-forms it enables. But also, engaging a program of design research that specifically addresses the metaverse and its relationship to the discipline of ARCHITECTURE.

We call this program of Design Research SPATIAL INQUIRY, the independent research for the invention of new spatial/structural typologies. Our active participation with "vehicles of cumulative innovation" will help assure that architects meet "the challenges posed by contemporary society, thus translating those challenges into viable briefs and design tasks to serve to upgrade architectures' capacity to fulfill its societal function" within our "Networked Society".

The following project will describe how our control group, a participating community of metaverse residents, are organized.

Project : (REZ)ident

Infra|Vergence will focus on co-presence as one of the metaverse's singular qualities. The project's incipient stage is the development of its proprietary database. During metaREZmalaquais workshop (École Nationale Supérieure d'Architecture Paris-Malaquais, February 2011), an Inworld residence on the ARCHI21-World Island (in the virtual world of Second Life), residents generated this database. A multiplicity of projects concerning the spatial organization and sustainable development of the ARCHI21 project's collaborative, networked environments were developed passively, recording of their inworld activity (movement, collaboration, building...). This database will enable workshop participants to follow-up the experience with a project of cartography.

MAPPING

Generating the actual visualization of the metaverse, takes place via a process called MAPPING. infra|vergence proposes to map not only the scale & extents, but also the form&structure of the metaverse based on data intensive usages of this complex nexus of infrastructures. To achieve this, we rely on the HYPOTHESIS that a network infrastructure can be shown as a function of the data that circulates through it. Thus, by measuring network activity concerning specific metaverse related tasks, we can make this network and its infrastructure visible. Data will be captured from the network activity of a diverse community of metaverse users, the project's CONTROL GROUP. Information will be captured by observing simple, pre-defined activities (or gestures) that are inherent to each world.

The Data types are qualitative data, which asks, "What is the activity?" (building, logging in, holding meetings, chatting, shopping...); quantitative data, which inquires as to the intensity of any one activity (its duration, how many (people, objects, things...), how much...); and locational data, which asks, "Where is the activity taking place?" (physical world, virtual world, social network...).

Although the activities are not necessarily the same in each world, they are compatible and comparable. : For example, bodies are mobile in both physical and virtual worlds, and, while not entailing the same

act (ie, taking an airplane vs. teleportation) the results can produce comparable quantitative and qualitative data (distance, location, velocity...) attesting to the specific activity. The compilation of this data will serve to describe the services (protocols, debit, units of exchange, location...), physical, locational and technical qualities (connective matrix, location, technology...) and the geographical territory in which infrastructures' are deployed.

Project : (VIZ)ualisation

During the metaREZmalaquais workshop where residents were generating a multiplicity of projects, metaCARTOgraphy challenge to trace residents path and activity. Its goals were to capture these informations, a bracelet was distributed to each resident, containing a script to record residents' inworld activity and transmit the data to an online database. All the residents wearing scripted prothesis were passively recording and transmitting data about their presence, their location and their proximity to each other. The collected data is aggregated in a database hosted by Pachube, a web-based service built to manage the world's real-time data. The visualization of simple tasks or events through recorded data was developed using grasshopper, which is a graphical algorithm editor.

These visualizations were developed both with historical and live data streams. Based on historical data-sets recorded during the workshop to manipulate these data in an offline mode. Otherwise, using real-time data-streams to feed and stimulate pre-established visualization frameworks. The process mentioned above allowed us to build a bridge between three environments: the workshop's ARCHI21 island, the pachube's online database and grasshopper's algorithm editor. The output was generated in Rhinoceros's 3D modeling environment in which Grasshopper is tightly integrated.

VERGENCE

Although data is objective project parameter, a numerical value, its subsequent representation is subject to interpretation. We developed spatially immersive visualizations as our interpretive, representational tool. These visualizations will evolve from 2-dimensional graphic abstraction to interactive, tactile spatial immersion, by accruing informational, material and spatial dimensionality. These representations will be built into an immersive virtual environment whose physics, spatial coherence and topography will be designed to SIMULATE scale, distance, interactivity and modularity... Embedding visualizations into immersive environments is compatible to the process of data mapping (which is the creation of functions between distinct data models, for data integration).

Thus we strive to effectuate a direct correlation between the content (or data) and its representation (or mapping) : for example, when expressing the SCALE of the metaverse, an immersive visualization permits us to develop a 3D space whose size and navigation are a direct (not metaphoric) expression of its scale. This is due to the fact that immersive visualizations take place in a virtual environment with physical characteristics (physics, movement, temporality) similar to the physical world we inhabit.

It is not a question of mapping the totality of this infrastructure, but of determining their extents. : The physical, virtual and online worlds of the metaverse each possess an inherent logic that is divergent and convergent with one another. Therefore, the actual extents and limits of any one world of the metaverse are nebulous; the lines separating them are blurred by their dynamic co-dependence. Interpreting

this data will be accomplished by isolating specific states within each world and representing their points of vergence, revealing the tension between :

comparable states (or activities) in different worlds (ie, distance and velocity for comparing mobility in virtual and physical worlds); different states (or activities) in the same world; and,

simultaneous activities in more than one world (ie, interactively representing the same data-set in a virtual world and in an online visualization).

Project SCOPE

To avoid analogy, metaphor or abstraction when attempting to represent the scale, location, rhythms or textures of a complex, global network such as the metaverse infrastructure, we will be striving to create an expression of the metaverse that goes beyond merely mapping its quantitative data --striving to combine representation and sensation. In the context of the infra|vergence project, this is a process entitled : DESCRIPTION/ENCRYPTION

This expression is, in fact, a means of FRAMING the world in order to better see the metaverse. Framing is “a system of entities, postulates and rules that enables society to identify, perceive and label an emergent phenomenon from the seemingly infinite number of occurrences”. The Immersive Visualizations to be developed by infra|vergence allows us to frame the extents of the metaverse.

DESCRIPTION/ENCRYPTION as an creative tool We strive to development representations that express the sensation of inhabiting a data saturated metaverse. What are some of the omnipresent realities that are deeply embedded in our quotidian experience, beyond our perceptive capacities? If daily interaction with volumes of data and numerous messages is part of our new “data-subjectivity,” how can we represent this experience in new ways? How can immersive visualization express the ambiguity, the otherness, the multi- dimensionality of our experience, going beyond already familiar and “normalized” modernist techniques of montage, surrealism, abstraction, by formalizing the fundamentally new dimension of being “immersed in data?”

This expression will take the form of not only visualization graphics, but especially of IMMERSIVE VISUALIZATION They will permit the revelation of the dynamic, evolving form of communication and transportation infrastructures as they facilitate the simultaneous occupation of digital and physical worlds across three networked spaces.

Framing

Data visualization in 3D environments becomes a question of inventing legible objects and spaces that are capable of revealing the situations, places or things that compose the metaverse. 404-Window is an installation presented at the 404 Festival in Trieste, Italy in 2009. Its goal was to “open a window between virtual and physical worlds; it accomplished this through the fabrication of “real images from virtual worlds and virtual images from real worlds.”

Through the use of real-time montage from within a virtual world, the superposition of a real virtual landscape (Sizigia, Second Life) is framed by a Heads-up Display (HUD) that is also connected to a data-base embedded in that virtual world, and accessible at geographically located beacons.

404Window is both a machine fabricating a dynamic spatial composition from the convergence of image and movement, information and form, meaning and emergence, space and force; a device for reading and writing the essential organization of a world (physical and virtual); and, a dynamic representation capable of revealing these conditions through the fabrication of an Image-Space. In this context, data visualization in immersive spaces becomes a genuinely new cultural paradigm.

Dataflow

The framework of computation and network connectivity is organized according to a Dataflow graph containing nodes that produce data streams (inputs), nodes that transform data streams (programs, algorithms, APIs, libraries) and nodes that consume data streams (output). Dataflow as a model of information processing is based conceptually if not physically, on a graph of data flowing between operations. Dataflow promotes the data in the system as its main component. Systems conceived using the dataflow prototype start with an input and succeed by illustrating how that data is used and modified.

This enables real-time message handling, a procedure necessary for this project

The following related project description fills in some of the details of the dataflow machine employed by the infra|vergence project.

Work Process

For creating an immersive representation of the metaverse, infravergeance will be harvesting historical and live data streams from networked sources, using them as raw material in a collaborative design environment. By measureing and comparing simple usage patterns inherent to each spatial typology, we can employ quantifiable and qualifiable data types. Data will be scraped from open source resources, open API's or publicly avaiable sources to extract and interpret network semantics and I/O data. Generative algorithms will be used to aggregate data-sets for the creation of meaningful spatially immersive 3-dimensional visualizations.

We will use visualization techniques to model the metaverse infrastructure based on data exchanges resulting from a simple network activities by the infravergeance community.

By capturing simple actions through the passive observation of the infravergeance community, measuring its movement and location, online and inworld activity, we can qualify, quantify and localize activities in each world. By organizing the data according to forms, textures, scales, proportions and many other characteristics based on keyframes consisting of coincidental events capable of placing the metaverse's three worlds in tension. Visualizing these points of vergeance in a spatially immersive visualization, composed of 2 and 3-dimensional, stable and unstable, passive and interactive representations, will allow us to represent and reveal the supporting infrastructure of the metaverse, thus mapping the scale, texture, intensity and context of this infrastructure. By accruing informational and spatial dimensionality, the

project will push its visualizations to evolve from objective abstraction towards spatial immersion. Visualizations will be created using interactive representations built into an immersive virtual environment whose physics, spatial coherence and topography will be designed to simulate the scale, interactivity and modularity of the hybrid infrastructure's form, location and intensity.

Project objectives

1. Create a representation of the metaverse, a map or visualization of its scale, limits and size that is both graphic and immersive, interactive and tactile.
 2. A program of design research
- - Research into visualization design : Develop knowledge concerning the coherence between the semantic and formal aspects of data visualization. How is the content or meaning of the data related to the formal qualities of its representation? (i.e. : using virtual worlds to represent information about the metaverse).
 - - Open Source Architecture : projects whose "production and critical, public, client (and) peer-related (reception) form part of the project itself, creating a feedback loop that can ground—or unmoor—a project's intention and ultimately becomes part of it..." These projects "supersede architectures of static geometrical form with the introduction of dynamic and participatory processes, networks, and systems... distinguished by code over mass, relationships over compositions, networks over structures, adaptation over stasis."

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CURIOSITY AS AN ARTIST'S BRIEF

Rudi Knoops

In this paper I will discuss some techniques that I use as an artist to instill curiosity. The criteria for my 'discourse' are set out by Stephen Bann in his book "Ways around Modernism" wherein he formulates an "ambitious brief for the present-day artist in respect to curiosity".

I will elaborate on this brief with references to my own work, and show how a media-archeological mindset can be a source of inspiration for an artist.



Fig 1. recording session with Psallentes @ AMUZ, Antwerp, Belgium. © Rudi Knoops



Fig 2. DIORAMATIZED #02, installation view @ M - Museum Leuven, Belgium. © Rudi Knoops



Fig 3. DIORAMATIZED #02, Psallentes? performing Hildegard von Bingen. © Rudi Knoops

The criteria for my 'discourse' are set out by Stephen Bann in his book "Ways around Modernism" wherein he formulates "a specific and ambitious brief for the present-day artist in respect to curiosity." [1]

I will here discuss some techniques that I use as an artist to instill curiosity, and elaborate on the three elements of Bann's brief:

1. that the practice in question should combine the process of experiment with the irreducible appeal of the singular object;
2. that the artist should seek to adopt, and of course to revise, historical precedents reminiscent of earlier conjunctures between art and science;
3. that our attention should be drawn to particular, appropriate types of locale for the work. [1]

The Brief - part 1

In a confrontation of present-day art practices with this brief, Bann refers to curiosity as a historical ricorso: the recurrent practice of retracing some of the older pathways with their ambiguous connection with art, science and technology.

For audiovisual media, this return to curiosity is advocated by different scholars in the field of media-archeology:

This anarchaeology of media is a collection of curiosities. [...] By curiosities, I mean finds from the rich history of seeing, hearing, and combining using technical means: things in which something sparks or glitters – their bioluminescence – and also points beyond the meaning or function of their immediate context of origin. It is in this sense that I refer to attractions, sensations, events, or phenomena that create a stir and draw our attention. [2]

Harking back to this 'deep time of the media' and uncovering undeveloped possibilities can be an important source of inspiration for contemporary art forms. A media-archeological mindset becomes a fertile context for serendipitous insights, a trigger for "fortuitous finds instead of searching in vain." [2]

The link between curiosity and research methodologies used is obvious: as the fortuitous finds that shock you into the awareness of new possibilities are unquestionably also the most interesting finds, curiosity – in its general meaning of an inquisitive interest – is always part of any research approach. My own practice, characterized by a research through design approach, could thus easily be rephrased as research through curiosity, or research guided by curiosity. And "it is the by-products of experiment that will often prove to be the most important dividend, at least for the artist." [3]

The Brief – part 2

Adopting media-archeology as a methodology has already partly answered the second part of the brief. But I still have to elaborate here on the media-archeology based techniques I employ in my work as a media artist, namely re-injecting analogue elements into the highly digital apparatus that video has become. The technique of anamorphosis is one such form of mediation that I use in my work.

It is however not a pure analogue form of mediation, as I first use algorithms to 'anamorph' digital video materials, and secondly I implement, on the viewer's side, mirrors that function as hardware mediators between the projected visuals and the viewer.

In fact it is a hybrid combination of exploiting the possibilities of the existing digital apparatus, and adding an analogue/hardware form of mediation using mirrors that questions the traditional audience-screen relationship.

ANAMORPHOSIS

Definition of Anamorphosis:

1. A distorted projection or drawing of anything, so made that when viewed from a particular point, or by reflection from a suitable mirror, it appears regular and properly proportioned ; a deformation. [4]

Anamorphosis is an optical curiosity that has a long history of being positioned on the intersection of the fields of science – architecture, optics – the magical and art. As an optical subterfuge anamorphosis is especially interesting because of its interfering with the laws of perspective: while asking the observer to view the distorted shapes from a determined point – thus enforcing a certain perspective upon the observer – anamorphosis at the same time shows the illusion of that perspective.

Exploiting this core characteristic of anamorphosis – the inherent possibility to impose perspectival limitations – touches the core of my PhD research wherein I explore how interventions on a number of parameters of the video apparatus can generate a sense of wonder and curiosity with the observer, in search of a contemporary iteration of the concept ‘cinema of attractions.’ [5] ‘Cinema of attractions’, not in its meaning of historical time indication in early cinema theory, but in its meaning of being an ever present undercurrent surging to the surface whenever the fascination for and the explicitation of the medium takes the lead.

Anamorphosis perfectly fits this picture of what a cinema of attractions can be, firstly by exposing the laws of perspective and thus focussing on the medium itself, but in second instance also by its many references to the realms of the phantasmagoria, the uncanny, the magical and the taboo.

Daniel Collins’ description of the observation of a single anamorphosis is of interest in this context

To observe anamorphic images, one must be an "eccentric observer", that is, an observer who is not only a bit "eccentric" in the usual sense of the term (i.e. "strange") but an observer who is willing to sacrifice a "centric" vantage point for the possibility of catching a glimpse of the "uncanny" from a position off-axis. [...] An eccentric observer is exactly the observer of the anamorphosis, an observer who literally "stands apart" and is self-aware of the process of seeing. [6]

In contrast to the traditional Albertian one-point perspective representation, that solicits an immobile stance from the spectator, an anamorphosis demands a dynamic act from the observer, an exploration of the 3D space wherein the anamorphosis is projected or displayed, in search of a favorable vantage point from where the warped 2D image coalesces into a coherent form.

One main type of anamorphosis is the group of catoptrical anamorphoses where special mirrors – cylinders, cones, pyramids, prisms – are used to reconstruct the distorted image. [7] In cylindrical anamorphoses a mirror in the form of a cylinder has to be used in order to view a reconstruction of the distorted image from a specific vantage point.

It is exactly the possibilities of cylindrical anamorphosis that I explored for the visual part of the media-installation DIORAMATIZED #02.

DIORAMATIZED #02

DIORAMATIZED #02 is an experimental design exploration in the framework my PhD research. I coined the word DIORAMATIZED because it refers on the one hand to the 19th century phenomenon of dioramas of which it transposes a few parameters into a contemporary interactive media formula: the modulation of light, the use of sound effects, the application of perspective, [8] the use of multiple moving images, or sometimes moving observers. On the other hand the word DIORAMATIZED carries some of the meaning of the word 'dramatized' as the multiple auditive and visual elements are presented in a very theatrical setting.

DECONSTRUCTION AND OPPOSING FORCES

The musical content of DIORAMATIZED #02 is the performance of Gregorian chants from four antiphonaries. For each of the antiphonaria the singers are filmed individually from top to toe against a black background. The video footage is being warped and displayed as separate visual elements. In the centre of each warped image is a cylindrical mirror. Only by looking at the mirror from a specific vantage point you will see the original recording dewarped correctly, the viewing angle being the key to 'decoding' the distorted image.

For the audio part of the installation, also each voice was recorded isolated. Each of the five visual layers has a corresponding sound layer, and the listening 'angle' coincides exactly with the angle of perception for the visual anamorphosis. But there is a difference built in that introduces friction between sound and vision.

From a distance, it is the sound emanating from the cylindrical construction that lures the observer to approach the installation. Upon discovery that next to sound, there are also images on display inside the contraption, the exploration of the manipulated layers of sound and vision can start.

The best position for perception of the sound layers is exactly in the centre of the installation, where the different sound layers merge into a 'surround' sound. The visual part of the installation works slightly different. Focusing on just one of the anamorphoses, it is perfectly possible to find a correct vantage point. Through the use of multiple anamorphoses however, and the specific circular setup, there is no ideal position to get a combined visual overview, and the search for good visual perspectives drives you away from the centre of the installation.

There is, in addition, the discrepancy between the size of the warped projections and the size of the dewarped reflections in the cylindrical mirrors. The warped projections function as points of attraction because of their sheer size and luminosity. When exploring the installation however, the dewarped cylindrical reflections may take over as main points of interest. As observer – an active viewer/listener – you make your own choice between these opposing forces of sound and vision.

The Brief – Part 3

The media-installation DIORAMATIZED #02 is an integral part of the exhibition 'Divine Sounds – Seven Centuries of Gregorian Chant Manuscripts in Flanders' at M – Museum Leuven from september 8 till november 27, 2011.

The centre of the exhibition is not only these manuscripts, but the audible music itself. Visitors can hear the music they are looking at, and listen to differences in style, form and performance practice in the installation DIORAMATIZED #02 by multimedia artist Rudi Knoops. Three top ensembles – Cappella Pratensis, Psallentes and Psallentes? – breathe new life into four antiphonaries from the eleventh, twelfth, seventeenth [...] and eighteenth centuries. The integration of an installation with historical heritage raises that heritage to a new level: that of contemporary art. It refreshes our collective memory and brings it up to date; the ancient traditional chants not only get a fresh coat of paint, but become an essential element of a new artwork. [9]

As visual concept for integrating the installation into the white exhibition space, I covered the top part of the installation in a mirroring sheet, and the reflecting light of spots draws a full circle around the installation, in balance with the light level allowed for the precious manuscripts on display. At the same time keeping the centre of the installation as dark as possible to guarantee the best visual quality of the images projected inside the contraption.

Second element of this lighting concept is an inverse application of anamorphosis, now utilizing pure light. On the inside of DIORAMATIZED #02 I use warped video projections and from specific vantage points you can see the video images reconstructed in the mirrored reflections. On the outside of DIORAMATIZED #02 however, I use lights that are reflected by the mirroring hull, throwing warped reflections on the floor that merge into one shimmering nimbus of light.

Third and final function of having this aura of light around the installation, is a reference to light being filtered through the stained-glass windows in a Gothic cathedral – which still is the ideal location for performing Gregorian chant.

Thus recreating part of the atmosphere of an "appropriate type [...] of locale for the work" comes close to an answer to the 3rd part of the brief of Stephen Bann.

Challenging the traditional audience-screen configuration

Through the use of anamorphosis, and especially through the multiple use of anamorphosis, I challenge the traditional audience-screen configuration. Instead of a viewer immobilized in an Albertian tradition of static one-point perspective representation, the observer becomes an active participant, who's full sensorium of vision, hearing, feeling, walking ... is called upon.

In this dynamic act of exploring the multiple images and sounds on offer in the audiovisual installation, the peripathetic observer becomes an active participant in the articulation of the projected – or (re-)presented – objects, and constructs his own perspective on the music performed.

This concept of the construction of vision through the dynamic act of the observer, comes close to an embodied phenomenological concept of perception. Mark Hansen positions the 'affective body' right in the centre of the perceptive act. In his neo-Bergsonian phenomenological concept of perception as an act of subtraction 'affectivity' is the sum of the "bodily modalities of tactility, proprioception, memory and duration." [10]

In DIORAMATIZED #02 it is the friction between sound and image that stimulates curiosity. Curiosity as the driving force, the trigger for bodily activity, the formative power in a dynamic and personal sensory experience.

As observer you engage with the installation, aware that what you see and hear is the result of a specific media configuration, but at the same time you are at risk to lose yourself in a fascination for the mirrored world created in this Wunderkammer of sorts.

In contrast to Collins' description of the 'eccentric observer' of one single anamorphosis, the viewer/listener explores the innards of DIORAMATIZED #02 – with its display of multiple anamorphoses – from within the installation. Instead of being an 'eccentric observer' in the literal sense, the viewer/listener immerses himself in a multi-perspective experience that challenges his curiosity and invites to explore these multiple perspectives.

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CROSSING OVER: ART, DIGITAL PERFORMANCE AND PRACTICE-BASED PEDAGOGY

Rachelle Viader Knowles, Wade Sakundiak & Kathleen Irwin



Crossing Over Web interface, designed by Wade Sakundiak

What we do, how we choose to act and interact and ‘spect-act’, perform and play and replay, will differ for each of us, at each moment, and for many political and personal reasons. One thing only is certain; we will be faced with such choices in ‘real life’ and in any number of digital or virtual performative spaces as well – even in our own imagination and dreams; in the spaces of our own desires (Goodman 294).

Crossing Over (<http://www2.uregina.ca/crossingover>) is an ongoing project devised by Kathleen Irwin and Rachelle Viader Knowles, connecting students from the Faculty of Fine Arts at the University of Regina with other students around the world. The workshop is a pedagogical art / performance / video project that investigates and engages the terms of cosmopolitanism as a way to constitute meaningful social networks by exchanging virtual performances -- and suitcases -- over the internet. The question that the project asks, about our responsibilities to strangers, is critical in light of global mobility, the blurring of borders and the instantaneous exchange of information that crossing over points, both real and virtual, represent. During the workshop, these ideas are explored using readings from Kwame Anthony Appiah’s *Cosmopolitanism: Ethics in a World of Strangers* (2006).

A visit to the website shows how the exercise unfolded. Student players in both locations were required to fill in an online immigration form in order to construct a real or imaginary identity. Each packed a “digital suitcase” with personal belongings (images, sound fragments, text, etc.) to equip them in their new life and to transport across a virtual border (or in this case, to upload to a baggage conveyor belt on the website). With the click of a mouse, students in the arrival country claimed suitcases from the conveyor belt and opened them, thereby making the contents available for public scrutiny. Following this

point of entry, emigrants were no longer in control of their destinies, as the recipient of the luggage was left to sort out its contents and plot a putative future based on knowledge of the current socio-political contingencies in the arrival country. The process attempted to replicate the crossing of international borders for immigration, emigration, or asylum seeking and suggested the tensions that occur when the fragments or “facts” of one’s existence are publicly displayed and possibly misinterpreted. Through the process, students were asked to consider their own country’s migration and refugee policies, their own response when confronted with “otherness,” and the problems associated with communicating the signifiers of one’s identity in a public forum in ways that may deleteriously affect outcomes.

The Crossing Over workshop offered during the 2011 ISEA conference is the second iteration of the project, connecting students from the Visual Communications Design program at Sabanci University in Istanbul with students from Visual Arts, Film and Theatre Design at the University of Regina in central Canada. The larger context is the city of Istanbul, itself a gateway or crossing over point between east and west, a cultural and creative nexus between diverse people and practices in art, philosophy, science and technology. The first iteration of the project/workshop was carried out in 2008 between students in Fine Arts in Regina and students at the School of Art in Utrecht in the Netherlands. The project was conceived during Knowles and Irwin’s tenure as University of Regina Teaching and Learning Scholars, a program designed to challenge university faculty to move beyond traditional divisions between research, teaching and service and towards more multilayered, interconnected, and interactive conceptualizations of faculty work. This project develops out of a teaching methodology, shared by Knowles and Irwin. It combines studio practice and theoretical investigation and understands that such interconnectivities encourage students to think broadly, deeply and creatively and to explore the possibilities that exist where one or more disciplines and cultures intersect or collide. Crossing Over concentrates on processes, theories and paradigms for innovative practice-based research that traverses distance, time, language and disciplines. It provides a framework for collaboration that engages students in a creative exchange of “identities” within a post-colonial context. This second iteration of the Crossing Over website was designed and built by Wade Sakundiak from the University of Regina Centre for Teaching and Learning, utilizing several technologies to realize the project goals. The site is built using ExpressionEngine, a CMS (Content Management System) used to facilitate user interaction with the database which holds each participant’s responses to the questions asked during the ‘immigration’ process. Building upon this base, Javascript and HTML 5 provide the frontend functionality and animation throughout the site, lending an element of authenticity as visitors explore participant profiles.

In the absence of avatars and mythic scenarios, as an interactive web-based activity, Crossing Over operates more as an international parlor game, played out in real time and at street level. The rules of engagement ask players to perform identities and respond in kind to their international teammates. In so doing, participants blur the distinction between performance and social networking. Players are asked to question the representational armature of narrative and character that conventional performance operates within and to see digital performance as a fluid, and evolving field - an intertextually coordinated, multiply located discursive field of operation.

The project is part of Knowles and Irwin’s ongoing research investigating changing modalities of performance that asks whether the Internet has any distinct, useful or unique characteristics that offers performance anything other than merely another means of distribution. In 1991, Brenda Laurel wrote that media opens new possibilities for experience and speculated that virtual reality would, in due course, contain more functions than databases, games and networks (Laurel 194-95). Less than two decades later, much has changed and such a statement is reductively self-evident. Indeed, while the internet today provides a multitude of opportunities for rich social interaction and ‘stealth’ learning outcomes,

the opposite is also undeniably true. It offers countless portals and opportunities for considering options and confronting difference, not all of which are congruent with the ethics of cosmopolitanism. Yet the consideration of these ideas, framed within practice-based research, offers a productive, albeit playful, exercise in implementing ethical strategies and rehearsing life skills necessary to function in an interconnected global community. The students who participate in Crossing Over are quick to recognize the limits of the paradigm we propose but are prepared to struggle with the ethical question Appiah posits – “how and to what degree are we responsible for others and how far do we extend kindnesses to strangers?” – as well as the related questions we proposed: “how do these questions relate to art making and new modes of dissemination and performance?”

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HYPERPRESENCE: TELEPRESENCE VIA QUANTUM CINEMA

Osman Koc

Today's technology enables us to impact and observe places by different telepresence methods. Telepresence methods have been implicated into various applications such as robotics, communication and art. The paper aims to introduce a new telepresence application for cinema, which creates a customized narrative by using the user's bio data.



HyperPresence, Osman Koç and Fethi Can Tüzel, 2010

As technology enables not only processing data but also transmitting them, we started hearing and using "tele" as a prefix in our daily lives. It has been attached to many different words such as telecommunication, television, teletext etc. After these reinterpretations of actions occurred with the advancements in technology and industry, another 'tele' prefixed word has been created, namely telepresence. Scott Fisher, one of the pioneers of the concept, explains "a technology which would allow remotely situated operators to receive enough sensory feedback to feel like they are really at a remote location and are able to do different kinds of tasks."

Telepresence encapsulates several subsections in industry like tele-robotics, video conferencing and so on. Each of these subsections approach to the aspect of stimulation of the remote location and sensory feedback from different angles. In tele-robotics the sensory feedback is mechanical, but the remote location can be virtual (haptics) or a robotic system (bilateral teleoperation). In both approaches the tactile sensation is crucial. The main purpose for tele-robotic applications is the remote location being haz-

ardous or inaccessible. Telepresence robots are also becoming popular, as they allow visual and auditory transparency, as well as controlling the motion of the robot in physical space. In video conferencing the immersion is enhanced by eye-contact and having the same interior design for the physical spaces at both sides.

There has been different ways of telepresence techniques experimented for artistic purposes. Kirk Woolford's work approaches to this concept by using the flow of air as a medium of telepresence. Two people wearing belts made of fans are present in two separate rooms. The cameras installed to the ceilings enable the users to be in the same room virtually. The way to sense each other occurs through the wind one creates as it passes by the other, which is created artificially by the fans.

In order to extend the boundaries of the telepresence concept, it might be illuminating to think about different media in which the user is immersed consciously or unconsciously, but does not have an active role. Edward Packard's "Choose your own adventure" book series offer an example to this argument. In the books, the user is immersed by the scenario of the books, while having the opportunity to initiate on some choices. For example the reader can decide whether to go out by the door, or escape from the window, by jumping to the corresponding page, which gives the reader the liberty to customize the narrative of the scenario. As the narration is customized, the reader gains an active role, therefore, even though it does not accommodate any technological infrastructure, Edward Packard's concept can be considered as telepresence also.

This article aims to introduce a new way of telepresence, through an interactive art installation called "HyperPresence" implemented in collaboration with Fethi Can Tüzel in 2010. In order to delve into the subtext of the project, the telepresence concept is fragmented as remote location and stimuli, which will be expounded in detail in the following sections.

REMOTE LOCATION

Remote location is the part of the system which is observed and manipulated. Depending on the system, the observing medium can be visual, audial or mechanical. In order to sustain immersion, it is compulsory for the remote location to provide transparent sensation to the user. In systems where the remote location is a physical space, immersion becomes dependent on the quality of the data, which is provided by the sensors. For example, if the user is supplied with the visual data from the location, and the quality of the image is inadequate, the user becomes aware that the image is not real, but merely a representation of the reality. Apart from the quality of the data, in systems with multiple sensory feedback mechanisms, the delay and synchronization also becomes pivotal in order to provide transparency. Immersion with virtual spaces is more complicated to achieve. Human cognition distinguishes real and virtual depending on the experience based reality perception. The virtual reality environments fail to mimic physical spaces, thus the immersion wanes. As the action-reaction relation continues, the conscious immersion starts to build. Virtual environments are built on mathematical models. We can consider reality as an n -dimensional entity (n being a positive infinite number), but the performance of the affordable technologies allow realizing the reality to some extent in order to sustain the real-time specifications of the system. Until the model based realizations reach, maybe not to the n -dimensional reality, but up to the human perception limit, virtual environments will always be distinguishable regardless if they are visual, aural or mechanical.

Cinema can be considered as a midway between physical reality and virtual reality, as it seems real, but the context and the time may not be. Thus, it represents a reality which does not originate from any particular bit of the real world, or as Jean Baudrillard names it “hyperreal”. In a cinematic experience, the audience attests the juxtaposed images which might construct a reality effect, albeit the fact that neither the context nor the time of the film are necessarily derived from reality. But the perception of quasi-real images is sufficient for the audience to be submerged in the experience unconsciously; hence constituting a counter-example to the physical and virtual remote locations, where the user’s consciousness tries to disrupt the immersion. This immersion into cinema is called as “the suspension of disbelief.” Thus, this concept can be exploited for the sake of telepresence, as the audience already evolves an immersion unconsciously. To close the sensing-acting loop, this unconscious state can be exploited as well, which will be elaborated deeper in the stimulation part.

In order to sustain and enhance the suspension of disbelief or the illusion of reality, the perception of the audience should be considered. Cinematic experience is subjective. Thus, the usage of some filming techniques causes different effects on the audience. First person point of view anthropomorphizes the observance, hence enhancing the immersion, as the user is not just an observer in the represented hyperreal space, but it observes as a passive character inside the actor. The technique can also be augmented by adding some eye-blinking mask to the video.

Other than visual technique preferences, the soundscape of the film also affects the immersion. As explained by Denis Pegge, the audial elements are ingrained depending on the audience’s experiences. The sound of an object in the video may be different than what the audience would have expected, which cracks the illusion. Another audial element of the video would be speech. Speech would diminish the effect of the video by attracting some attention to the context of the speech, which is even worse for non-native audiences, as a result of the subtitle texts.

Lev Manovich denotes, emergence of the new media caused paradigm shifts, the constants are changing into variables in operational relationships. With these new perspectives in media, it is inevitable for any medium to stay untouched, which is also the case for cinema. Interactive cinema enables the audience to participate in the film by different ways. “Kinoautomat” is considered to be one of the first examples of interactive cinema by Raduz Cincera screened first at 1967, where at nine instants the movie stops, and an operator asks the audience to choose between two different possible scenes for the movie to continue onwards, by virtue of which the audience is authorized for deciding upon the progression of the narrative.

Apart from the motion capture based cinema, video games are also considered as interactive video, as they use computer as an interface to act between the series of video sequences. As the interaction with the medium closes the action-reaction loop, and users’ perception adapts to the visual medium, the immersion is cultivated, which leads to the feeling of telepresence. As aforementioned, cinema is hyperreal; ergo the telepresence with a hyperreal medium creates the “hyperpresence” concept, which also originates the name of the installation.

In examples of interactive cinema, where user is augmented with the ability to manipulate the narrative, multiple user based interaction might reduce the quality of personal experience by diminishing the feeling of participation as the outcomes of the interaction differs from personal responses. Considering that telepresence is a singular entity, the presentation of the work has been chosen to be a one-person experience.

The concept of interactive cinema conceived several different related concepts like quantum cinema which is originated by Peter Wiebel. The concept of quantum cinema, as the name implies, arises from quantum theory. Heisenberg's uncertainty principle denotes the trade-off between the measurement accuracy of position and momentum of an electron at an instant, which means the observance, manipulates the subject of the experiment, therefore the real data is uncertain. Another quantum theorist, Richard Feynman, has focused more on to the initial value problem of a system, where the system should not be considered as a whole, but as transitions between several different states, which all have different initial values. In a cinematic context, these concepts can be interpreted as the manipulation of the film as a result of its observance, and the film having different possible paths which evolve from different initial states.

The HyperPrescence project exemplifies the aforementioned "quantum cinema" concept. The film used in the project is montaged in a non-linear way time-wise, which is linearized by the software depending on the responses of the user and the diachronical state of the film. The film starts from a single part which evolves to different narratives and endings as it is observed, and each inversion creates different possible films customized by the user. The decision points of the film are predefined; therefore finite numbers of possible films are present.

Without elaborating deeper about the technology fetish in interactive art in order to maintain the focus of the paper, it should be pointed out that the subject matter should also not be neglected. The theme of the film is based on an incubus dream that most people could have experienced or at least familiar with in their lives. As it has been explained before, the film is shot from the first person point of view, with eye-blink masks in order to enhance immersion. The method for harvesting the users' responses will be discussed in detail in the next part.

STIMULATION

Interaction is more than the machine obeying to the user; it is also the experience that the user lives. User interaction can be both conscious and unconscious depending on the type of interface and briefing about the experience. The interface can be a physical controller with some sort of form factor, or transparent like a camera based interface; but in both cases if the user is informed about the interaction, it will restrict the interaction as it leads the user to investigate the mapping between the actions and the responses, and eventually loses its playfulness and become just a tool. One stance against this may be creating a system with more organic responses in which the interacted medium does not always give the same responses, when given the same set of inputs. This would probably create a similar experience without satisfying the user's curiosity as a result of the stochastic responses of the system. On the other hand, what if the user is not aware of the interaction? The interaction interface and the obligation to interact consume some of the user's attention, which diminishes the effect of the experience. As a result unconscious interaction enables the user to get immersed in the experience without feeling obligated to interact. Unconscious interaction is like improvisation, where the line between user's cognition and intuition fade. In order to enhance the instinctiveness of the responses, biosensors should be considered as a medium of interface. The beauty of the usage of bio data for interaction is that, it anthropomorphizes the overall synthesized being, consisting of the body and the machine. Therefore bio data can be used to sustain and observe the effectiveness of the designed experience.

The roots of using bio data for non-medical purposes go back to lie-detectors, where it is assumed that the body doesn't lie. Bio data is specific to the source, which results in having a unique experience for

each user. Even as a result of inadequacies of the platform, the outputted bio data is the same, the resulting effect on the user is always unique, as Leibniz's identity of indiscernibles principle.

Cognitive sciences have developed thorough interpretations of bio data, which resolves to the user's emotions. Therefore, bio data is highly intimate and should be handled with delicacy by the designer. As the bio data is not fully governed by the user, unpermitted public exposition of this data would be considered unethical. As bio data represents the true self, it has been used for several different non-medical purposes. The fingerprint or retina scanners and camera based face recognition software provide advanced security systems which prevent the possibility of hacked or forgotten passwords. Marcel Van Der Drift exemplifies the misuse of bio data in "A Future Love Story", where the interpretation of bio data creates a positive feedback in the formation of user's moods, as the user becomes more depressed by gadgets interpreting the state of the user as depressed and the user finds salvation in technological homicide.

More artistic usages of bio data have been present in several media due to the new meanings they represent. DNA portraits offer an unusual way of representing the uniqueness of an individual. Christian Nold's experiment used skin responses of the user's in order to create an emotional map of a city. One of my previous artworks "Living Istanbul" examines the relationship between the sounds of a city and the heart rates, or the rhythm, of the dwellers. The installation uses the heart rates of the audience in order to recreate the different soundscapes of Istanbul.

The downside of biosensors is that, the user can be affected from any previous situation, which creates the user's initial state. Furthermore, during the experience the user can be haunted by unprecedented concerns which also lower the quality of the experience. In order to overcome this problem, the norm of the user is calculated before the first decision point of the film, and had been used as a reference to measure the deviation of the users' responses.

The HyperPrescence project uses an electroencephalogram (EEG), for measuring the brainwaves to interact with the aforementioned quantum cinema setup, as it offers a fast representation of the arousal state of the user. It measures the amount of activity of the brain by the alpha and beta waves, the data is interpreted as the user's state being relaxed, tranquil or alert and excited, which is used to alter the narrative of the film.

CONCLUSION

In order to present an overview of the HyperPrescence project, remote location and stimulation parts have been discussed separately. Different media and concepts have been investigated regarding the immersion of the user. Motion capture film has been chosen as a remote location medium, in order to benefit the predisposition of the users' suspension of disbelief.

As it has been stated before, the conscious interaction creates an obligation which diminishes the quality of the designed experience. The non-initiative state that the user enters as a cinema audience inspires the usage of biosensors as the stimulation interface. Bio data is not fully governed by the user, with the state of the user in mind, the true responses of the user have been tried to obtain in order to differ the experience from a game and anthropomorphize the overall structure which results in a more organic relation.

The user experiences a film that revolves around the theme of incubus, shot in first person point of view, wearing an EEG sensor without any further information about the forthcoming experience. Furthermore, the whole interaction process is explained at the end of the film as a classic grand finale in order to keep the user unaffected about the technological infrastructure of the setup. It is expected from the user to realize the transformation from an individual audience to the protagonist of the film, which fulfills the telepresence concept.

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PERFORMER VS ELECTRONICS: PERFORMING MUSIC FOR INSTRUMENT AND ELECTRONICS

PANAYIOTIS KOKORAS

This paper investigates the challenges which face a performer when he/she has to practise a composition for instrument and electronics at home alone and then perform it in a concert hall. Analysis of a survey of performers identified an incapability of playing a work with electronics. In the second part of the paper, I propose a paradigm for performance material that could provide the necessary information for the performer.

1. Introduction

More and more performers today are asked to perform compositions for instrument plus electronics. Are they ready to do so? What should a performer know in order to be able to accomplish such a project, and what help should the composer provide? How far can a performer go and how much can a composer ask? A great deal of knowledge is required, and the problem looks initially to be very far from what a performer usually knows. [1]

2. The Survey

At the beginning of this research study, professional performers of new music who were under forty years of age were contacted by email and asked to complete a simple questionnaire. The questionnaire described a scenario in which a performer receives performance material in order to practise a piece for solo instrument and electronics at home alone, and then perform it in public. Questions were asked:

1. about their level in music technology and sound engineering (novice, intermediate or expert),
2. about the equipment they owned (laptop computer, external sound card, speakers, and microphone),
3. about their interest and their desire to programme a work with electronics and finally,
4. whether they had any experience of playing such a work and, if so, what their most recent experience was.

Analysis of the survey revealed a mixture of high scores on the practical questions and at the same time a lack of ability to play a work with electronics. Question four was intended for those respondents who answered 'yes.' In brief, starting with the responses to question three, the selected participants were positive about studying and programming a piece including electronics. Also, 100% of the respondents answered question two by saying that they owned three of the four listed items of equipment. The most disappointing result came from question one: 86% of the participants described their level in music technology and sound engineering as 'novice' and the rest described themselves as 'intermediate'. These findings result in two conclusions. On the one hand, their education had not offered them modules on music technology and sound engineering. On the other hand, the performance material which they received from composers had not helped them sufficiently to enable them to go through with a piece. These two major issues raised from the survey will be discussed in the following paragraphs.

3. Performance notes as a protocol

First, I shall take as a case study four works of my own for one instrument and electronics. These works are *Slide* for guitar and electronics, *Shatter Cone* for violin and electronics, *West Pole* for piano and electronics, and *Jet* for recorder and electronics. [4] I shall propose a paradigm for the performance material that will provide sufficient information to enable a performer to practise and play a piece alone. This could work as a reference for a composer and as a guide for the performer to know what to expect and how to prepare a work for performance.

The four works listed above were written for one amplified instrument and electronics. The electronic part combines fixed electronics in the form of pre-recorded electroacoustic sounds and live electronics that come to life as a response to the performed part. The performance material includes:

- the score,
- the performance notes,
- a stereo track of the fixed electronics,
- a mono click track audio file,
- a folder with the extra plugins, and
- a folder with the preset settings of the plugins.

Finally, it is useful to provide a full version of the piece as a reference. The performance notes, apart from the instrument's performance and notational instructions, should provide information about the four elements explained in the following paragraphs.

3.1 LIVE ELECTRONICS

The Live Electronics section should provide instructions on the main application needed and how to use its session for the piece, which are the hot keys, and what are their functions. Moreover, there should be displayed screenshots of the plugins to make sure that the settings of the vst effects are loaded properly in the first instance. This section should also explain the way that the live electronics is going to be notated on the score. It is of vital importance that the composer should provide a sort of notation for the live processing. The performer should, by reading the score, be able to anticipate the when, what and how of the way in which the live electronics contributes to the piece. Finally, to make sure that the real time processing produces the expected result, some sound samples should be provided with each of the effects applied separately. Thus, it would be easy to compare the example sound with the performer's sound and to figure out possible incompatibilities. [2]

3.2 HARDWARE SET UP

To study such a piece, the performer should be equipped with some hardware, primarily consisting of: 1) a laptop, 2) a sound card (at least three outputs, one input), 3) a microphone, and 4) a pair of speakers. A signal diagram is useful to show the way the signal is traveling through the devices and the software. The stage layout should clearly show the position of the speakers, the performer and the microphone, as well as the way to connect the devices. In addition, information should be provided about the Audio Preferences menu of the software used and how to make sure that it has the right setting.

3.3 AMPLIFICATION

Once the software and the hardware are up and running, it is time to give some emphasis to the amplification of the instrument. The microphone should be placed close to the instrument. According to the composition's needs, it is recommended to have the microphone placed on an adjustable stand so as to be able to control which part of the instrument will be closest to the microphone. In addition, it should be made clear that the idea of the amplification many times is not just to make the sound louder but to create a supernatural sound which results in the loss of the neutrality of the classic known instrumental sound.

3.4 FIXED ELECTRONICS

The notation of the fixed electronics (or taped part of the composition) is important because the musician should always be able to follow it and be in sync with it. It should be placed in a form of sonogram staff below the live electronics staff line. The sonogram works as a visual representation of the tape part to help the performer to follow it accurately. The sonogram can be enhanced by the composer or the performer with extra shapes, words and rhythmic motives. At the left top corner of every staff, the time of the pre-recorded material is displayed. In the fixed electronics sections, there is also the click track which is useful not only during the practice but also for the concert performance. It should be appropriately arranged according to the tempo and time signature changes of the piece. Another issue which should be clarified in the performance material is the distinction between the rehearsal and concert situation. In the concert, the click track should be routed to the headphones only. In the rehearsal, the session should be flexible enough to start at any point. [5]

4. Conclusion

All the above described information will considerably increase the possibilities of a performer playing a piece with electronics successfully and repeatedly. It remains in the hands of the educational institutions to include it in their courses or improve their curriculums with opportunities to enable students to acquire the necessary knowledge to be able to carry out such projects. Music conservatory performance students should be able to follow classes with the focus on the performance of electronic music, and should have close collaboration opportunities with fellow composers, and the inclusion of compositions for instrument and electronics should be encouraged by teachers and included in the examinations concert programmes. [3]

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IDENTIFYING PLACE AND PLACING IDENTITY IN TRANSNATIONAL TRANSMEDIA: A CASE STUDY OF TWO CONVERGENT MEDIA PROJECTS

Julian Konczak

Two case studies currently in development will be examined from a producers point of view while focusing on targeting new audiences, The two projects – TELENESIA and ANTIGONE INTERACTIVE both employ different toolsets that relate to the location and preferences of the target audiences.



"Telenesia/Antigone Interactive"

"A Transmedia production will develop storytelling across multiple forms of media in order to have different entry points into the story." [1]

The key point within this terminology being the idea of working *across* platforms as distinct from other models of digital storytelling such as "remediation" and "crossmedia" where content is replicated across platforms.

TELENESIA is a fictional place and alludes to a distant and inaccessible "no place" and resting on the idea of a place that exists beyond and outside of the increasingly throttling networked communication. Conceiving a physical location that is post- network and by inference suggesting a post- apocalyptic time zone developed out of a research edition of hidrazone.com and was used as a overarching terminology to describe the process of increasing fracture of audience experience as the communication networks get more pervasive. Hence, a range of digital media tools and working practices were brought together under an umbrella term – computational video, VJ sampling, glitch to name a few.

TELENESIA evolved into art based project in that the principle outlet for the work is an installation within an art gallery, however, in engaging with the key concerns of the work – fragmentation and atomization of post network communication – there were clearly opportunities within a multi-platform setting.

The core of the work draws on two key influences. Firstly, the occult power of the moving image is fictionalised in Theodore Roszak's *Flicker*, a pacey novel that follows protagonist Jonathan Gates. The narrative revolves around an academic researcher who penetrates a shadowy religious order responsible for embedding subliminal images into Hollywood - later to be forcibly marooned on a Pacific island with a decaying film archive. In many ways the background of the novel reflects an enduring 20th fascination linking occultism and media developed by figures such as William Burrough's *Cut-ups*, Bryon Gysin's *Dreamachine*, Kenneth Angers *Magick Lantern Cycle* and work by the English filmmaker Derek Jarman.

The other strand being explored in the work is the hardware hacking and glitch cultures that in turn are driven by what is often described as a post-modern deregulation of narrative, scratch video and VJ culture. The aesthetic intention is to attempt move on from post-modern nihilism where the destruction of image is an end in itself and to use these atoms of destruction in a novel fictional edifice.

Beyond the gallery, TELENESIA expands across ephemeral networks allowing the exhibition slot to use platforms as both publicity and marketing opportunity as well as providing a legacy in the form of documentation and video. The installation itself is built on "physical computing" sculptures – boxes that allow the visitor to the gallery to access and play with a database of short video clips using analog controls i.e. dials and knobs and while there was no intention to replicate this experience on-line, elements of the narrative have been extended into the internet.

The initial building block of the project was the 1-minute video that would emulate and draw in some of key tropes and practitioners of experimental moving image. These short films have been posted into a video blog and exhibited at international film festivals prior to venue and funding confirmation of the show tour. The project has been in development over a number of years and initially the look and feel of the video pieces was developed as a VJ set that used digital tools according to an "analog rule set" i.e. using image effects in line with film optical printing. An underlying impulse before devising this set (which featured with a vocal sampling group) was to move away from the hegemony of hard edge graphics and explosive eye candy of mainstream VJ culture – the VJ community appears to be hungry for material so the source clips have been released under a CC license and distributed via torrents thus creating an on-line participatory mode to compliment the installation.

ANTIGONE INTERACTIVE explores the relationships between physical location and narrative in a parallel and complimentary manner. The focus of this project is to tell personal stories of migration and political conflict – accommodating films created by experienced filmmakers exploring the hidden side of personal family history. By focusing on the personal over the political it entails challenging of the inherent artificial nature of political boundaries and the de-humanizing effect of the nation-state.

The genesis of the project grew from previous projects by the producers that had used a global interface to allow the audience to access video content reflecting stories and places from around the planet.

In developing the work within the confines of transmedia the producers use the borderless map as a starting point, borders become apparent as users drill down into content. This reflects the restrictions of movement across the surface of the planet that is the starting point for the narrative threads. To this

end the Google maps API with its extensive capabilities for overlaying geopolitical information and location markers was chosen as the key interface device.

Common to much of material created for internet consumption, work tends to be molded into short form productions such as the website, in designing the narrative structure of the project it, the challenge was to tell rich and complex stories while maintaining an offering that could be consumed in bite sized chunks. The work uses an episodic structure that enables a longer form story to be communicated while only experiencing a 4-minute section at any one time.

The interface enables the audience to access the video segments using a variety of menu options: a tagged map using Googlemaps API, a gallery of thumbnails and a video player that allows the clips to be watched as a long form video more akin to watching television, thus the user can calibrate their own experience in terms of levels of interactivity.

In terms of the viewing experience the tablet/ipad was the optimal distribution device that was chosen for a number of reasons – that the viewing environment could to some extent be predicted and the strength of the quality of video playback. At early stages of development, the creation of an app was considered has the potential to provide consistent rich media experiences, however, the limitations over distribution, extensibility issues and the fact that user base would be necessarily limited precludes this option.

Drawing together the two projects it can be noted that they exist in almost opposition to one another TELENESIA is a fiction that attempts to move audience in space and time, while ANTIGONE INTERACTIVE is underscored by accurate sense of personal experience. Whilst elements of their transmedia existence may bear some resemblance in that they use short video within a web based interface and such like, they are operating at different ends of the spectrum TELENESIA challenges the audience to immerse themselves into an escapist fiction while ANTIGONE INTERACTIVE intends to awake a political dimension within the user.

telenesia.com

antigoneinteractive.com

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MICRO-MOCAP

SUSAN KOZEL

Motion capture performances used to be equipment heavy, fraught with calibration problems, and only for a privileged few. How have things changed? Developments in tracing, capturing, archiving, and sharing motion (including the Kinect) suggest mocap might play a different role in our daily lives. Further, there may be scope for synaesthetic translations or transmedia applications.

Micro-Mocap

Literature at the turn of the 19th century was described by Jacques Rancière as: “the new writing made up of sensory micro-events, that new privilege of the minute, of the instantaneous and the discontinuous.” [1] Developments in tracing, capturing, archiving, and sharing motion at the turn of the recent century suggest that tiny, motion captured gestures might be another way of writing the minute, the instantaneous, and the discontinuous. Further, there may be scope for synaesthetic translations or transmedia applications. This short paper briefly describes a journey through experiments with motion capture, ending with speculations regarding new developments and the role for captured motion in our mediated lives.

THEN (DISSOLVING INTO PARTICLES)

Looking back at much of the motion capture experimentation I have done since the 1990s I see fragments of bodies: points, lines, particle systems. Movement billowing outwards, then being condensed to a single point. Dancers walking through each other’s data points as though wandering through constellations, or using their feet to create strokes like calligraphy. Creating basic data bodies out of Bezier curves, that twitched, bent back on themselves, or lost their proprioceptive maps only to reform with a leap and a stretch. [2] Endless fun, if you ignored the nightmare of calibrating these heavy optical or magnetic systems. We left small dark studios at the end of the day, blinking in the light, feeling imaginary markers on our bodies.

Experimenting as a dancer for many years, using whatever system I could get my hands on, my philosophical and aesthetic questions returned repeatedly to the sense of the data as an “other.” Not a mirror of my and others’ movements, but the sense of dancing with an other that challenged my own corporeal and ethical boundaries. It is possible to say that these experiments always somehow dissolved the body without losing its materiality: true to Deleuze’s understanding of Spinoza, bodies were composed of speeds and slownesses, combined with the ability to affect other bodies and be affected by them. [3]

NOW (TURNING THE PRACTICE INSIDE OUT)

Now the mundane beckons: less spectacle, less calibration, less performing in theatre spaces or secluded labs, and more the idea of capturing affect and motion in daily life. A question arises: can mocap,

that digital system most able to capture external form and virtuosity, be used to capture liminal or ambiguous internal states? This is part of a larger project aiming to explore Immanent Aesthetics in order to understand how our new technological devices may be able to foster internality, quietude, intuition, and depth – and social choreographies. [4]

Micro-Mocap is an experiment in accumulating a personal vocabulary of nothing movements, or little kinaesthetic snippets. Perhaps it is like a DIY Motion Bank without performative aspirations. [5] But can motion, once it is captured, really be non-performative?

The micro-movements of performing life are those moments where dance intervenes, where gestures become slightly more than pragmatic but may express very little. Jean Luc Nancy's reflections on sleep as the "formation of an interiority" where we cannot distinguish ourselves from what is not ourselves are strangely relevant. [6] I am my tiny gesture. And I am my grand gestures. I reflect the gestures of those around me to the extent that capturing motion is not about my movement at all, but movement as patterns of circulation and exchange.

So when I play with the ubiquitous Xbox Kinect, improvising a daily narrative of nothing movements, or micro movements, am I closer or farther from understanding how I move or inhabit the world? For now the gestures are not recorded: and in itself this reminds me of the ephemeral quality of live performance, back before we had to become documentation obsessed and a dance took place and disappeared. If I decide to save these motions (to capture and preserve, rather than capture and release) giving these to others will be like the strange intimacy of sharing a blank text message. Its blankness is often thought of as a stroke: so intimate that nothing needs to be said in it.

AND (VENTURING INTO THE DOMAINS OF SYNAESTHESIA AND TRANSMEDIA)

As the liminal states of corporeality are explored through motion capture with the Kinect it is clear that the question of what is sensed (the input) is relevant, but it is more necessary to question what form the output takes because the Kinect is not designed to hold on to data. We have to decide what becomes of our motions, what happens to them and who receives them, in what form.

Marcus Ghaly, animator and interaction designer based at Malmö University in Sweden, recently created a poetic transmediation of Kinect motion capture data into a tactile output. His intent was to explore devices to assist in the translation of visualised motion into haptics: pragmatically, this is a prototype of a device that might assist people with visual impairment; poetically, Ghaly enacted a synaesthetic transition from the kinaesthetic realm into visual data and then to tactility. According to an aesthetics of immanence it is possible to ask what disappears through this sliding across sensory registers, and what is gained when something of oneself is externalized, possibly shared, and then returned to oneself: like falling asleep and then waking up, the same but different.

There is, of course, a long tradition of dancers considering tiny, repetitive, or pedestrian motions, or recently of dancers simply refusing to dance. This has been done with a sense of defiance but for some reason I am reminded of Efva Lilja's choreographic experiments on arctic ice. She set up a video camera on a tripod near the Nordic research ice-breaker where she voyaged with other scientists and, in her bright red foul weather suit, she repeatedly stood and fell, with the wind and snow whirling around her. These simple acts of falling and getting back up revealed much about motion and corporeality, captured

and archived by digital video. 'Micro Mocap' intends to be spectacularly underwhelming, but revealing of the minutiae of dance in everyday life.

In a discussion with an interaction designer recently, he asked why he should consider performance and performativity in conjunction with his work. This sort of question, so basic but at the same time encompassing, stopped me in my tracks for a moment, making me question my own assumptions and put deeply held convictions into words. "Consider performance," I said making some disciplinary translations in my head as I spoke, "if you want to reflect upon your design work in terms of dynamic patterns of actions, and if by creating interventions you hope to disrupt social structures or codes, or hold a mirror up to yourself or your culture." In this sense, from the cosmological to the mundane, motion capture performance experiments can be used to reveal what we are as intercorporeal beings and how we dynamically inhabit in the world.

Or could they could become very personal movement vocabularies, immanent motion, a part of one's life to save as an archive or edit together into a choreography and send to someone. Like a gift.

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THE BIRTH OF MEMORY FROM THE SPIRIT OF THE MACHINE

ANDREAS KRATKY

The computer is a machine of the future – not only do we still attach to it the connotation of technological sophistication and future orientation, also in its function as an information processing machine it only deals with the present, calculating towards to future. In the project “Bleeding Through” we use a database structure and signifying chains to explore the past and the subconscious processes of meaning creation described by Lacan.



Bleeding Through – Layers of Los Angeles 1920-1986, 2002, Rosemary Comella, Norman Klein, Andreas Kratky, computer-based interactive installation, Copyright by the authors.

INTRODUCTION

The computer is an amnesic machine; and it is a machine of the future. It appears in most of the science fiction imaginations of the future – shaped different ways, sometimes giant, sometimes minuscule, sometimes steam-driven as in the steampunk imaginations – it always belongs to the future. The computer still has an association of “high-tech” joined to it. How can a machine that is so inherently linked to visions of the future be used as a conduit for a reflection of the past? And how can a machine that purges everything from memory when the power is off be used for a reflection on memory? In the interactive database novel “Bleeding through – Layers of Los Angeles 1920–1986” we are developing an interaction method embodying the process of memory and the interplay between personal and collective memory. “Bleeding Through” is conceived as an interactive DVD-Rom by Rosemary Comella, Norman M. Klein, and Andreas Kratky. [1] It is produced as a joint research project by USC’s Labyrinth Project and the ZKM | Center for Art and Media.

The inspiration for the piece came from Norman M. Klein's book "The History of Forgetting", where he digs into the urban restructuring of Los Angeles and how traces of the old are remembered and forgotten. Klein uses the notion of 'simultaneous distraction' as a concept to describe how memory is constituted by a continuous and self-corrupting process of inscription and re-inscription – a "distracted imaginary, essentially a filing system where information disappears or reforms itself whenever you touch it." [2] This notion of a 'distracted' filing system is somewhat close to one of the central metaphors of the computer, which, besides its capacity to compute numbers, is in many applications a large storage unit or filing system. But what actually is the relationship of the computer and memory? This is one of the central questions motivating our research into how to represent the process of remembering and misremembering algorithmically. We explored this question with an excavation of the complex layering of past and present in one central area in Downtown Los Angeles. Guided by the story of Klein's fictitious character Molly, we built a comprehensive archive of photos from different time periods, re-photography, film, newspaper clippings, maps, interviews etc. that is assembled in a digital database, which can be explored by the viewer through a narrative interface. This paper discusses the process of conceiving the interface and traces the conceptual decisions behind its design.

COMPUTERS AND MEMORY

The person who coined the term "cyber", which has become the prefix to many of the computer-related concepts and contraptions, Norbert Wiener, describes the relationship of the computer to the past and memory as a function of two extremes: First, a very fast short term memory that is necessary in order to keep the values that are necessary for the ongoing calculation at hand. These intermediate results are of no use anymore once the process is completed and at this moment the memory used to store these values should immediately be emptied and made available for new calculations. And second, the opposite of this fast memory is the long term storage, the "memory which is intended to be part of the files, the permanent record." [3] Disregarding the long term storage, Wiener's view is focused solely on the processing unit that gets entirely emptied after a completed run of its process to make room for the next process to run on the machine uninhibited by previous results. The human, in contrast, never completely clears what is stored in memory and thus should be situated somewhere between the two extremes that Wiener describes, as "the analogue of a single run of such a machine." [4]

The engineering effort of Wiener concentrates on making the machine memory as precise as possible and keeping the information, once stored, intact and repeatable until it is intentionally erased. In this sense one of the predominant concerns of the cybernetics researchers was to identify a method of distinguishing discernible information from distorted information that disappears in noise and becomes unreadable. Noise in these information transmission systems is the influence of the environment: "It is unfortunate that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound or static, or distortions in shape or shading of picture, or errors in transmission." [5] The technological aspect of layering uncontrolled signals from the environment with the intended information can be seen as a parallel to the notion of memory "distraction" that Klein alludes to. Since the days of Wiener and Shannon the information processing machines have made great progress, the computer is a perfect amnesic machine that can forget everything on command and that got rather good at isolating the wanted bits of information from the unwanted. The machine has only two states: Either full recall or complete forgetting. For the human being it is not possible to simply forget everything. Most human beings are indeed somewhere between the two extremes: unable to recall everything and equally unable to forget everything. Klein also alludes to Borges' story of "Funes, His Memory", a man who has perfect recall. After an accident Funes has the

ability to remember everything, even the slightest detail, and in view of this immense amount of data he became unable to go through his recollection again, as it takes more time to go through everything that is remembered than it takes to live the event. Thus he only two or three times reconstructed an entire day. Funes came to the resolution that he should restrict his past days to a recollection of some seventy thousand moments ordered by numbers – but he realized that he would probably by his death be done with classifying his childhood memories and dropped this endeavor. [6] Voluntary forgetting and selective memory are hard to achieve. The human brain seems to be constructed to fulfill this filtering function completely by itself, without conscious intervention. This is a characteristic that would call for an ‘imperfect machine’ in the sense of Wiener and Shannon and the opposite of the ‘pure machine’ that Edgar Allan Poe develops in his analysis of the “Turk”, a chess playing automaton made by the inventor von Kempelen. The chess automaton was a supposed mechanical machine that was able to play chess and that won most of the games it played, in very few occasions it lost. Poe states that a ‘pure machine’, would show no irregularities, and it would always win – therefore the chess automaton could not be a ‘pure machine.’ [7] As we know it was not a mechanism, but a human operating the “Turk” in reality, and it was the human brain that was able to establish this middle ground between absolute perfection and imperfection.

In his essay “A Note on the Mystic Writing Pad” Sigmund Freud describes a mechanical device that embodies the characteristic of this middle ground, a memory support that is able to harmonize the opposition between a lasting storage of information and the erasure in order to make room for new inscriptions. What he describes is a children's toy, a writing pad with a wax layer onto which a sheet of paper can be pressed by writing on it. The areas where the paper sticks to the wax will show the trace of writing, while the others won't. By lifting off the paper from the underlying layer of wax the writing becomes invisible on the surface, but it stays as an engraving in the wax underneath the paper. This combination of an always fresh writing surface, ready to take new inscriptions and a remaining trace, that gets altered each time new inscriptions are made but still preserves traces of the prior impressions is for Freud an allegory for the human capacity of memory. [8] What seems to be possible with the mechanical device is a serious challenge for the digital machine. As the computer is made to be precise and all its elements are designed with the goal of the ‘perfect machine’ in mind, this kind of unreliable inscription is hard to achieve – what would be an algorithm for selective forgetting, or what should be the heuristic to select what should be forgotten versus what should remain? What are the alterations that are produced through new inscriptions? Not only it seems that it is hard to design algorithms that are made to produce irregularities – as we know, even real randomness is almost impossible to achieve with the computer [9] – it also seems to be in the human psyche to not want to intentionally lose anything. All our tools are made to preserve and keep, from the stone inscription and the note pad, to the museum and the database.

CALCULATING THE UNCONSCIOUS

There is a different way of conceptualizing the relationship of the computer to the past: Another story of Borges, the “The Library of Babel” describes the idea of a complete library, a library that contains all books, all that have ever been written and those that will ever be written. In this library it is sufficient for a book to exist that it be possible [10] – the library is the hypothetical construction of the space of all possible recombinations of the set of the alphabet. The books are thus not seen as meaningful entities but as instances of a possibility space – where meaningful combinations might be the exceptions. This perspective of a library is without any past, as “it has existed ab aeternitate” [11] and will exist eternally – it is the tireless activity of a probably very simple recombinatory algorithm, which does not need to

keep any information about the past. Based on the transformation rules of the algorithm it is possible for every possible state to calculate the next state. The implication here is that every seemingly meaningful experience can be seen as a simple combinatory instance of such an algorithm.

The Russian mathematician Andrej A. Markov has investigated this idea and in a parallel to Borges' later story he used a book for his experiment. The inventor of the Markov chain, which, named after its inventor, later became an important mathematical device, determined in a detailed analysis of the pages of a book in long matrix calculations the probability for character sequences to follow each other. As his study object he used Alexander Pushkin's novel *Eugene Onegin*, which for him became the abundant source of combinatory instances of character sequences. The probability chain that he identified represented a pattern that is sufficient to predict the continuation of the sequence without regard to the content of the surrounding text.

Markov's theory of signifying chains inspired later Jacques Lacan to formulate his theory of the unconscious as a chain of signifiers that determine the subject. A specific symbolic sequence akin to the Markov chain governs like a formal language such psychological effects as remembering and repression. [12] Lacan saw this chain also as the explaining principle for what Freud called the "Wiederholungs-zwang", the compulsion to repeat. He writes "we can find in the ordered chains of a formal language the entire appearance of remembering, and quite especially of the kind required by Freud's discovery." [13] Lacan sees the ordering principles inherent to this kind of formal language, expressed as a chain of probabilities for a specific sequence, as determinant for the acts and subconscious affinities. Rather than explaining these acts and associations as stemming from past experience, they are the results of a probability structure that is almost like a 'personal formula': "This could illustrate a rudimentary subjective trajectory, by showing that it is grounded in the actuality which had the future anterior in its present." [14] The intuition behind this formula relates directly to a computational approach and Lacan suggests that it would be possible to conceive of a modern calculating machine, a "thinking machine", to operate according to the specific formula that modulates a subject's choices. [15]

INTERFACE ALLEGORIES

For our design of the interface for the piece "Bleeding Through – Layers of Los Angeles 1920–1986" we were looking for an approach that could on both the functional level as well as the aesthetic level embody aspects of the "distracted imaginary" process of remembering between personal and collective memory, and fiction. Our goal was to conceive what I called an "allegorical interface," [16] an interface that constitutes a figurative or symbolic representation of the core aspects of the media text that is experienced through this interface. As in an interactive medium the functional dynamic aspects are an integral part of the experience, they are in extension of the visual, textual, and auditive elements conceived of as a procedural allegory that embodies aspects of the processes described in the media text.

The idea of a signifying chain formulated like an unfolding syntactic structure that develops based on an interplay between transition probabilities from one state to the next and the subjective acts of choice of the viewer is the central idea for the functioning principle of our interface. We conceived of this chain as a sequence of presences and absences that formulates a "scansion," [17] as Lacan calls it, a rhythm of 'slots' that are filled as the viewer navigates through the piece with elements from the database. The elements from the database take the role of associative presences that enable the viewer to fill in the absences, the gaps between the loosely composed elements, with his imagination. The act of imagining is thus initiated and guided by the succession of database elements and, framed by the story that Klein

invented, the imaginative activity of the viewer fills in the reading of these elements as possible characters of the story, possible places where the story may have taken place, or possible events that could have influenced the story. All the elements oscillate between their role as a document that shows places, people, and events in the real history of the city of Los Angeles, and the role they assume in the progression of the fictional story. In this way the imagination of the viewer is invited to interpret them in both ways, as historic traces as well as fictional elements, and contribute their background and experience to the multi-layered experience. As the viewer navigates through the materials, they line up in an endlessly cycling chain in which the succession of elements is determined by the choices of the viewer and a probability ranking based on a keyword system that we extracted from the story.

Visually this chain is implemented as an allegory for the act of strolling through a city where the viewer is exposed to a continuous succession of impressions that unfolds as he goes forward. A central panel shows one element from our database that can be explored in depth to reveal its historic context, such as a cross fade of historic images with their contemporary rephotographed view, further explorations of a specific location etc. Left and right from this central panel are images that are only partially visible, cut off by the borders of the screen, which stand for the elements in the peripheral field of view attracting the viewer to divert left or right. As he chooses one of them, this element swings into the middle position revealing another element on its side. In this way the elements succeed each other in an endless chain, which may show repetitions but repeated elements always appear in a different context so that the recombinant principle incites new readings and contextualizations even though elements appear familiar. We see this process as a re-encounter of a familiar object or image, which is always altered by the past experience and thus never the same as it was when it was first encountered, thus implementing an allegory for the simultaneous distraction of memory through the ongoing process of inscription and re-inscription.

The visual form of this interface is a long panoramic strip akin to the perspective of going through the city. On the other hand it evokes associations of a film strip or an editing machine underscoring the role of media and their representations in our memory process. In particular in a city like Los Angeles this latter association underscores the influence that media representations have on collective memory and individual perception.

CONCLUSION

The Markov chain implementation as the algorithmic principle behind the experience of “Bleeding Through” is compelling from a theoretical point of view and in practice delivered the anticipated results. We realized, though, during our production that a careful fine-tuning of the process was necessary to achieve the “middle ground” between mechanical perfection and ‘subjective distraction’. Finding the right keywords, the right amount of keywords, and the correct probability weightings was a process of trial and error, which was not only restricted to the fine-tuning of the engine but also required us to make adjustments to the database. We also found that in order to make the process of memory inscription and erasure noticeable and develop the right narrative tension, we had to limit the amount of presented elements at a single viewing to a subset of the available database. Further it was necessary to implement several kinds of layering systems that introduce an additional superposition of images and meanings to add more depth to the recombination engine.

Through several user studies we found that the process of eliciting associations and stimulating the imaginative engagement of the viewer with the experience worked well. And even though the principles

that are at the basis of the combinatorial process of the work remain hidden to most viewers, it still is effective on the perceptual level and presents a compelling heuristic for design principles.

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THE MUSEUM MACHINE - OR - A DATABASE APPROACH TO THE REPRESENTATION OF SPACE

Andreas Kratky & Juri Hwang

We generally think of space as a coherent and continuous extent and the representation of it is dominated by the linear perspective. In the project “Venture to the Interior” we are formulating a database approach to the representation of space. We are creating a hybrid mixed-reality environment that integrates multiple points of view and allows to explore a layered structure of parallel spaces.



Venture to the Interior / Vorstoss ins Innere, 2010, Juri Hwang and Andreas Kratky, computer-based interactive installation, Copyright by the authors.

In this paper we will discuss the methods and design considerations that we developed for the creation of the Cine-Interactive “Venture to the Interior / Vorstoss ins Innere.” The project is a real-time 3-d environment that investigates the nature of the museum as an apparatus of collecting and cumulative knowledge construction. We used the collections of the Natural History Museum in Berlin, Germany, as an example case for the act of collecting as a way of understanding the world. With the project we are looking at a tradition of collecting objects as part of an emerging scientific practice and worldview that originated during the Renaissance period, when the first private collections were formed in the 15th century, [1] and that had its high time as a public institution during the age of enlightenment and the 19th century. Collecting material objects was regarded as a prime way to gain knowledge since then and only lost its primacy in the recent years around the end of the twentieth and the beginning twenty-first centuries, when the material object got replaced more and more by its coded representation in form of DNA sequences, scans, and measures, and when the museum as a spatial construct started to fade behind the ubiquitous databases. [2] With our project we are reflecting on the status of the object and its representation, and the museum as an architecture of knowledge – a spatial construct that embodies a particular worldview. In creating a virtual representation of the museum and its objects, we are on one hand contributing to the virtualization of the material culture of the museum while at the same time raising awareness and questioning this very process. The question of representation of objects and space is therefore a key element of the project.

THE IDEA OF THE MUSEUM

What gets lost in the reduction of objects to their data representations is the material existence of tangible objects and their binding to a location in a spatial continuum. It is a turn away from the material culture of knowledge that was established in the Renaissance period and dominated the natural sciences for a long time.

Among the Renaissance savants the possession of objects was equal to the possession of knowledge. In the acquisition of such objects – preferably exotic objects, such as birds of paradise or fossils – one could physically acquire knowledge and display the possession of it to gain the reputation of a learned person. [3] Building private collections was a popular activity among the upper class along with the creation of spaces to display these objects as a way of showing economic wealth as well as knowledge. It was an important part of learning about nature and it was the foundation of a particular material culture as part of the sciences that moved away from studying the antique texts as the source of knowledge and towards an experiential contact and engagement with nature. [4] The museums of the early Renaissance – more cabinets of curiosities than museums akin to our modern concept of museum – were architectural structures representing the order of the world according to the “book of nature”, and displaying the secret relationships between the objects was a way of deciphering this book and the divine order of the world. [5] The spatial arrangement and the act of “taming” the wild beasts on a shelf in a collection was also a way of maintaining some control over the exploding natural world that was constantly growing in complexity as travel and increasing knowledge revealed more of it. [6] These early collections were conceived around their owners as the central figures. Representing the world from their point of view, the collections were at the same time reflections of nature and of the individual self. This importance of a spatial ordering system persisted when the majority of the private collections became public institutions and as museums became a display case of national importance and pride.

The other aspect that gets lost by the replacement of the object with its data representation, is the aspect of reality. Even though the real object needs to be preserved in order to survive over time and become the eternalized reference for a species, and the wild animals need to be killed and transformed into a taxidermy in order to be stored in a cabinet, they still preserve a reminiscence of their individuality and the reference that they once were living beings. And even though the taxidermy is in some sense also a representation, as one single dead instance stands as *pars pro toto* for entire species of living creatures, the data object in contrast does not have this reference at all and thus lost its direct connection to the world.

THINKING ABOUT PERSPECTIVE

With these considerations in mind we developed a spatial concept for our project that allowed us to address these questions and make them tangible. As a central element of the project we decided to create a virtual representation of the museum space itself as we found that the actual built space is the core element in the function of the museum as a collecting, ordering, and display system, and it is the stage of the play of representation versus the object. This virtual representation is conceived as a real-time 3D environment that users can explore at will using a common game-engine. The way most software represent space as a virtual entity on the screen follows the principles of linear perspective as it was devised by the Italian Renaissance architect and artist Filippo Brunelleschi and that had its first description in the “*costruzione legittima*” by Leon Battista Alberti in 1435. A good description of this perspective approach can be found in Erwin Panofsky’s seminal essay “*Perspective as Symbolic Form*.” The way we see

a perspectival representation of a space is as a “planar cross-section through the so-called visual pyramid; the apex of this pyramid is the eye, which is then connected with individual points within the space to be represented. Because the relative position of these ‘visual rays’ determines the apparent position of the corresponding points in the visual image, I need only draw the entire system in plan and elevation in order to determine the figure appearing on the intersecting surface. The plan yields the width, the elevation yields the height; and if I combine these values into a third drawing, I will obtain the desired perspectival projection.” [7] This construction renders a continuous and homogeneous space, but in order to realize this impression and to absorb all content into one single “quantum continuum”, as states Panofsky, it has to be assumed that there is a single viewer who sees the scene only with one eye and that the planar projection of the space can be seen as a valid representation of our spatial perception. [8] This notion of linear perspective corresponds rather closely to the way the collections of that time were conceived – a perspective of the world of which all lines converge in the one person, the collector, at its center. This way of representing the world was shattered by the development towards modern science.

The computer generated real-time rendering is not per se constrained to the assumption that the viewer stays immobile as is the case in static linear perspective constructions, since the viewpoint is continuously updated to the current position of the viewer. But nevertheless, most computer-based perspective constructions adopt the postulate of the continuous and homogeneous space. There is still only one single point of view from which the entire world falls into place and is displayed correctly. These are abstractions to which we are so accustomed that we almost accept them as natural. We have seen them throughout centuries of painting, in almost all of the photography, and finally we see them taken over in most of the computer graphics imagery. It is for this inherent feeling of natural perception that computer graphics go generally with linear perspective, even though the machine would be perfectly able to generate all kinds of other representations of space that follow different mathematical models, such as Michael Noll’s four-dimensional hypercubes, [9] or fractal geometry.

BAROQUE PERSPECTIVE

While linear perspective and the Renaissance collection correspond strongly in their way to represent the world, the modern museum stands for a different perspective. Even though it is equally conceived as a location within which all things in the world fall into place and in this way constitutes one big system of order and knowledge, it realizes this notion based on other abstractions. In order to represent entire species, single individuals are collected; likewise single objects stand as representations for entire regions. The museum space in fact presents itself as a system of references reaching out into the world – like a space that is folded over and over to encompass and absorb all the distant locations into its own volume. This notion comes close to some of the central elements of the thinking of Gottfried Wilhelm Leibniz, a Baroque scholar who was instrumental in the founding of the museum in Berlin and in the development of the idea of scientific collection and display as a generator for knowledge and further research. Leibniz is well known for the invention of the infinitesimal calculus and his solution for the “quadrature of the circle”. The intuition for his approach to determine the surface of the circle stems from linear perspective eventually dissolving it into a system of floating points of view. The quadrature of the circle was one of the paradigmatic problems raised by the ancient geometers and became a metaphor for an intractable problem. Taking inspiration with perspective construction, Leibniz divided the circle from a single point of view into an infinite series of triangles. The area of each of these triangles can be calculated and therefore the area of the circle can be calculated as the sum of a series of triangles, which can be infinitely smaller and thus the calculation can be infinitely more precise. [10] From

this notion he developed a general approach to calculate any shape or curve by subdividing it into a series of small triangles in order to make it tractable. While this quadrature of the circle solution is still close to the idea of one central viewpoint from which the entire shape falls into place and becomes calculable, the way this concept enters into the philosophy of Leibniz is as a duality of inflection points and points of view of which Gilles Deleuze gives a succinct description in his book “The Fold – Leibniz and the Baroque”. The point of view in this model is the point at the interior of a curved shape where all the perpendiculars to the tangents of this curve converge. The inflection point on the other hand is the point where a curve changes its direction. As the Baroque curve is marked by an irregular and changing curvature, it is described by an infinitesimal series of directional changes. We can see it as the complement to the vectors on the interior of the curve converging in the point of view, as a series of divergent vectors reaching into infinity. [11] This concept of an endless variability implies that the resulting space circumscribed by this curve is characterized by multiple points of view that change their positions from the interior to the exterior as the curvature shifts from concave to convex and back. This Baroque extension of the perspective view as it was formulated in the Renaissance, introduces a relativism that perceives space as the sum of a multitude of points of view. It constitutes space as endlessly folding between local discontinuities within a large continuum. This is what Deleuze calls the “very idea of Baroque perspective.” [12]

A DATABASE APPROACH TO PERSPECTIVE

This inspiration about the representation of space and the idea to extend the linear perspective as it is implemented in most computer graphics applications led us to the development of a hybrid approach that we call “database perspective”. It integrates the familiar linear perspective construction with a series of defined relative points of view and allows us to address the composite nature of a collection that draws a comprehensive picture of nature from an almost endless amount of collected individual objects. It uses the idea of a folding principle connecting the museum building to the various locations out in the world and, by referencing the idea of a continuous shifting of viewpoints and the successive “falling into place” of the perspectives, gives a metaphor to the procedural nature of the ongoing and by definition never finished project of collecting. The concept of cumulative knowledge construction as it stands behind the idea of the museum is an endless process of generation and revision of knowledge.

The layout of spatial elements in our project uses the museum as a central hub that is explored by the user. The museum is represented as an abstract space consisting of the floor-plans and elevations of the original building as it is described in the quote from Panofsky above. Using the line drawings of the plans gives us the opportunity to evoke the notion of the building of knowledge as an imagination and points the viewer to the fact that the museum itself is an abstraction and idealization made regarding the human understanding of nature. It appears as a line drawing delivering associations on one hand to the architectural plans of imagined buildings yet to be completed, and on the other hand, it is akin to the wireframe images evoking the imaginary worlds of virtual reality as they have been established as classic notions of computer-culture by media pieces such as the Gibson novel “Neuromancer,” [13] the film “Tron,” [14] or the game “Rez.” [15] From this central hub the viewer can access multiple “context spaces”, which display certain topics and explore other locations and times, such as the submarine fauna or objects from the ‘Wunderkammer’. The viewer can access these spaces by passing through objects located in the virtual museum that serve as representations of and portals to the “context spaces.” The geography of these spaces and their relationships to each other are organized in a recombinant database structure symbolizing the references and vectors reaching out from the museum into the world

and that follow the intuition of a folded space with various extensions, which are only possible as virtual spaces in a virtual architecture.

The central museum space is filled with photographic images of the actual museum building, arranged in the virtual space according to the perspectives from the various points of view as they were taken in reality. The resulting impression of the space is a composite akin to a spatial collage of images that fade in and out as the viewer passes through the space and approaches the various points of view. We have adopted a similar concept for the representations of the objects in the museum that serve as portals to the context spaces. Each object is represented by a series of photographic images of the real object showing the different sides of it, which are displayed as the viewer moves around the object. All sides of the object are shown in ten degree steps and imply the notion of continuity and three-dimensionality while at the same time communicating the gap between the individual representations, much like the idea of an infinitesimal series – coming close to the original but never reaching it. Our decision to use photography in combination with a computer generated space was motivated by the desire to evoke the reality reference of the objects and contrast it to the abstraction of pure data representation. As Roland Barthes describes, photography has the power to evoke an idea of direct reference to the object that was photographed, much as the reality reference of the taxidermy in the museum: “The photograph is literally an emanation of the referent. From a real body, which was there, proceed radiations which ultimately touch me [...] like the delayed rays of a star.” [16]

As a way of overcoming the abstraction made by most of the linear perspective constructions, the restriction of the view to one single eye, we decided to present the project as a stereoscopic three dimensional projection. This significantly heightens the immersive quality of the experience and makes the complex spatial system more readable for the viewer as it uses stereoscopic vision to support his perception and resolve the spatial relationships within the space.

THE MUSEUM AS EXPERIENCE

The reflection about perspective and the representation of space is an important aspect of the the project “Venture to the Interior / Vorstoss ins Innere.” During our research and production of the project we have realized that the specific quality of the space and the distinct feeling of historic presence that spans many centuries are essential aspects to communicate. We have used the representation of space as a symbolic way of communicating these feelings and allowing the viewer to enter a space that is normally inaccessible, as, in contrast to the show-collection, the scientific-collection, which is the largest part of the museum, is not publicly accessible. These decisions are important aspects of the communication process and warrant careful consideration, they should not be left as contingent on the tool that is being used, as there is no neutral or, as James Elkins writes, “meaningless perspective.” [17] With the reference to Leibniz we are alluding to the notion of the museum as an educative and entertaining experience that he formulated in 1675 in his text “Drôle de Pensée” and where he described the use of exhibitions, machines, and all kinds of media spectacles as a way of fostering scientific engagement and as a generator for new insights into nature. [18]

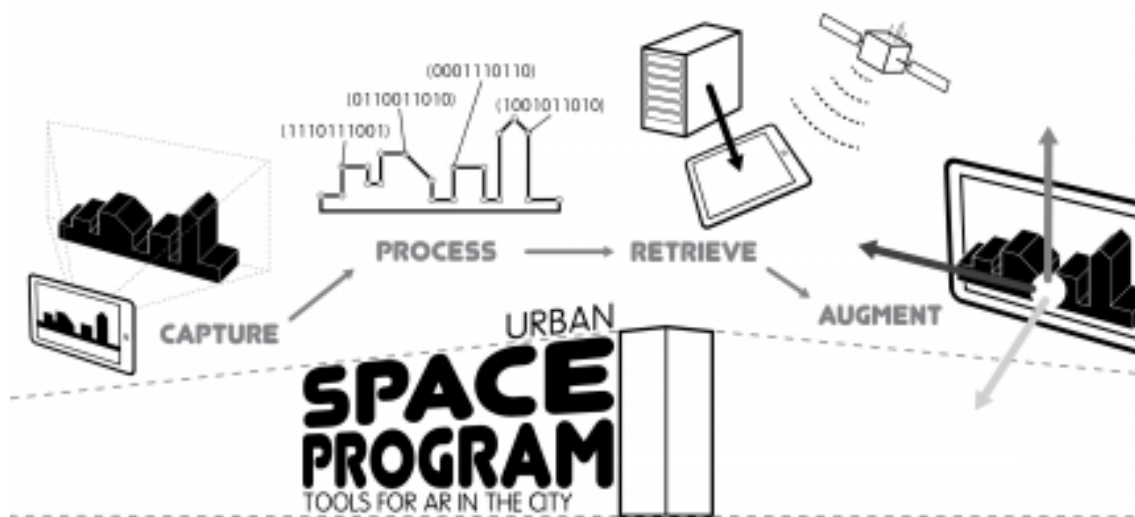
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PROGRAMMABLE SPACE

Sam Kronick

This paper draws an analogy between the development of the programmable computer and conceptually related projects to develop programmable architectural *spaces*. I propose that the computational power of mobile devices and augmented reality technology can be used as a method of revisiting these utopian dreams. In this spirit, I lay out the plan for a software toolkit for such mobile applications titled *Urban Space Program*.



System overview for the Urban Space Program augmented reality toolkit, currently under development by the author.

The Program Metaphor

In the field of architecture, the term “program” refers to the types of spaces to be included in the building or set of buildings— a university’s program would call for classrooms, auditoria, dormitories, food service, etc. The architect’s job is, in part, to shuffle around the building masses necessary to house these functions into an effective form. Whereas most architecture renders the program static, a distinct movement of mid-20th century avant-garde architects focused on the design of frameworks or superstructures into which various programatic elements could be inserted, removed, and replaced with relative ease. Such dynamic architecture is exemplified by Cedric Price’s *Fun Palace* (1961-1964), Archigram’s *Plug-In City* (1964), Yona Friedman’s *Spatial City* (1959-1960) and Constant Nieuwenhuys’ *New Babylon* (1959-1974). [1] In all these projects, the users of each structure are given agency to reconfigure their environment by moving about walls, staircases, or even entire rooms within a grid of possible locations. In this way, these spaces move from being programmed to become *(re)programmable*. An analogous shift occurred at about the same time as single-function computers (such as World War II-era

ballistics trajectory computers, or desktop calculators) transitioned to the von Neumann architecture of contemporary microprocessors— an architecture that supports interchangeable programs.

Suggesting that space itself can become programmable is not an unprecedented metaphor; software architects have been borrowing language and concepts from their brick-and-mortar counterparts for decades. Examples include Eric S. Raymond's seminal paper *The Cathedral and the Bazaar*, [2] Mac OS's "Core Foundation" API, Ruby on Rails' "scaffolding," and the general focus on "software patterns" (including the "factory method" pattern) which implement the style of thinking suggested in Christopher Alexander's *A Pattern Language* [3] far more extensively than the architects for whom it was originally written. Curiously, this conceptual crossover has been largely one-directional. Contemporary architectural discourse is rife with discussion of how best to use software tools like CAD/CAM and Building Information Modeling systems, but, except perhaps for a few loose interpretations of the term "Open Source," [4] the philosophy of software design has not had a great impact on the art of making space.

Challenges of Programming Space

A possible explanation for this asymmetry is that making physical space programmable isn't as easy or effective as it looks on paper. Take, for example, Japanese Metabolist Kisho Kurokawa's *Nakagin Capsule Tower* (1972)— a rare example of built architecture that embodies principles of modular, interchangeable components. Its 140 micro-dwellings are designed to be removed from its two central towers and replaced every 25 years. Thirty-nine years later, the capsules are hopelessly outdated (with their built-in reel-to-reel tape decks and corded telephones) but replacing them with new modules has proven difficult to organize and finance, so the building as a whole is at risk of demolition. [5] It is likely a similar fate would have met the other avant-garde designs would they have been built, too.

Nakagin's capsules seem to be more inspired by the industrial revolution's notion of interchangeable parts than the computational revolution's interchangeable programs. Thus, Nakagin and other blueprint-based speculative architecture can be read as analogous to the mechanical analytical engine of Charles Babbage, an early computer that aspired to do with gears and levers that which was ultimately only made efficient through the transmission of electrons. [6] In an era of cheap digital computing, these architectural visions from the past century deserve a fresh look. Not only are computational tools unthinkable more powerful than they were when Archigram and the rest were designing, they also embody the notions of portability, ubiquity, and pop-culture integration that fueled these designers' visions. With a mobile phone in the pocket of an ever-expanding percentage of the world's population, the low costs of experimenting with software provide a viable alternative to periodically retooling factories as a means of reprogramming space.

Of course, the challenges of making a physical space programmable are not just technical or economical in nature; there are social barriers to achieving a critical mass of spatial dynamism as well. Architects like to think that everyone is as interested as they are in contemplating the buildings around them as a part of everyday life. The mid-century avant-garde was no exception; Price's *Fun Palace* was pitched as a viable business model for a citizenry that would crave spatial reconfiguration as a weekend leisure activity, and the imaginary species *Homo ludens* set to inhabit Constant's *New Babylon* would not only be allowed but expected to build diverse spaces inside a maze of homogeneous, standardized parts as an act of play. That people would jump at the chance to engage with such systems seems a misguided assumption.

tion in hindsight. In revisiting these visions, it might be best to look at a growing contemporary subculture that already has practice in the sort of spatial literacy needed to take advantage of reprogrammable space to its fullest. Here, the popular model of video gaming can provide guidance.

Virtual Games to Augmented Realities

Some of the most successful video games explicitly use space as a core gameplay mechanism. Maxis' *SimCity* outright casts the player as an urban planner with no other reward than those that come from implementing a satisfying plan, while newer games like Valve's *Portal* series require a player to keenly read the walls, voids, and walkways, of the surrounding space and precisely alter its topology in order to reach the next level. There are plenty more examples of interesting game spaces, but perhaps the most relevant to the mid-century avant-garde is Mojang's *Minecraft*. [7] This low-budget indie hit takes place in a world made entirely of one-meter cubes that bears a striking resemblance to the sprawling overhead grid of Friedman's *Spatial City*. The gameplay stems from the fact that this cubic world is entirely mutable. Every cube can be "mined," carving out voids into the terrain, and subsequently replaced to build up structures with the radical variety of LEGO bricks. Its two-button interface (left click destroys cubes, right click places a new one into the grid) perfectly captures the duality of literacy that is an ability to both read as well as to write within the grammar of a given system. A careful balance of gameplay combined with this novel building mechanic creates a highly addictive experience. The result is a user base of millions; *Minecraft*'s multiplayer worlds are teeming with activity that would make any participation-hungry architect jealous. *Minecraft* demonstrates that gaming is a format full of deep incentives for participation, capable of training actors to effectively transform their world. What *Minecraft* lacks (along with myriad other "virtual worlds"), however, is the connection to the physical cities that interested the avant-garde as spaces ripe for critical intervention—spaces that might be the foundation for widespread social reform or political revolution. This is where we must depart from purely synthetic spaces and move into the hybridized space that augmented reality can provide.

Augmented Reality (AR) is a general term that suggests a perceptual blending of the physical with the virtual. At this point in time, it primarily refers to the computer-aided superimposition of textual/graphical annotations or 3D geometry over a live video feed. The format most relevant to the discussion at hand sites these functions inside a mobile phone or tablet computer—computational machinery that contains a critical combination of portability, ubiquity, processing power, location-awareness, and wireless networking which could facilitate urban-scale exploration by a multitude of users. Not only does AR hold potential for its ability to fuse engaging synthetic game spaces with socially meaningful physical places, it works on the level of vision, augmenting the image of the city and thus connecting to a primal sense of how we perceive ourselves as inhabitants of the surrounding environment.

As masters of visual presentation, architects have long been working with a sort of proto-AR to communicate their ideas. Yona Friedman's sketches for *Spatial City* were often drawn over real photographs of the existing city, using what currently is as a starting point to show what could be. The overhead maps of Constant's New Babylon were made from cut up pieces of other maps, pasted as an overlay onto the intended site. Archigram was famous for their use of collage to illustrate how their radical visions might look in the context of a familiar space. While these images were static and captured only a moment in time, they represented plans for vibrant, active spaces. The real-time, on-site nature of AR has potential to extend these composited, active urban plans of the 20th century with the socially-networked, interactive technology of the 21st.

Form Follows Framework

Bringing all this together seems too great a task to be accomplished by a single piece of software. One great AR app will not change the world, just as one Metabolist capsule tower could not transform millennia of architectural wisdom about the importance of permanence. Fortunately, an alternative path can be discerned by hybridizing the historical precedents with the practices of contemporary software design. The mid-20th century avant-garde did not aspire to design singular monuments; instead they focused on the production of systems which would facilitate a certain kind of desired activity. Form followed framework—the latter manifest as structural steel beams, service hookups, communications equipment, and machinery to manipulate modular substructures. Even after years of development, the physical design for the *Fun Palace* consisted of little more than a set of towers and gantry cranes that would move along suspended rails to construct the interior under the command of the structure's spatial programmers. Likewise, the notion of a framework in software design consists of a set of algorithms and data structures which are targeted to approach a certain body of problems without solving any one in particular (frameworks exist for robotics, graphics programming, user interfaces, etc). The constraints and structure of the framework define the configuration space of derivative works—the space of all possible programs that could be built on top of what is put forth as merely a starting point. Therefore the framework creates not a single application, but embedded seeds which self-replicate as they aid and influence how others approach the design process. In this way, a multitude of programs may arise that carry on in the spirit of the original framework but also, as products of various programmers' desires, mitigate the shortcomings or authoritarian impositions of the original structure.

Design Considerations for an Urban Space Program

Existing augmented reality frameworks neither usefully constrain the problem space by targeting a clear set of applications nor do they provide relevant algorithmic tools that are specific to the task of reprogramming the city. What is needed is an AR framework for spatial programming, targeted at the creative coders who use software as a primary means of aesthetic and conceptual communication. Such a framework is currently under development under the working title *Urban Space Program*. In developing this framework, several design choices became clear.

First and most importantly, the framework needs to be able to recognize where in the city a user is located and what they are looking at. This can be accomplished by combining location-aware sensors such as GPS, compass, accelerometers, and gyroscopes with computer vision data gathered through a mobile device's camera. All existing AR frameworks at this point in time use one of these methods or the other but do not fuse data from both sources. Frameworks that are location-aware without using vision (such as Layar [8] and Wikitude [9]) tend to augment with textual annotations rather than alternative geometries because of the limited accuracy of GPS; pixel-perfect image alignment is only possible through the use of computer vision. [10] In *Urban Space Program*, building facades become fiducial markers; the distinct face of a storefront or tower replaces the blocky black-and-white barcode as a machine-readable identifier. The other on-board sensors help limit the search space of which facades might possibly be in view and, using a set of algorithms called "sensor fusion," fill in the gaps when no known facades are visible.

Second, the framework needs to be built with a client-server architecture to enable simultaneous augmentation of a scene by multiple users. If all data were stored on each user's mobile device, changes

made by one user would not immediately be available to another user in the same area—this would create a fundamentally single-player experience that runs contrary both to the social act of building promoted by the historical avant-garde and the multiplayer nature of successful contemporary video games. Thus, storage and processing of augmented data and recognizable facades happens on a server and is streamed to the users' devices as they enter a new area and reprogram the space. Rather than centralizing this on one server, the software tools are openly available for installation on any number of servers from which the mobile device can choose to connect to, allowing parallel systems to operate in the same locale.

Third, the database of facades should be built in part with user content. This is suggested as a critique of the historical architectural projects; while designed *for* radical user participation, they were not designed *with* users. In each case the architects unilaterally chose the sites and situations in which activity would take place. In the case of AR, it is easy to imagine that if only the system designer can define which buildings are recognized (and thus which can be easily augmented), this encourages applications of the framework which perpetuate traditional power structures. Recognition of a fixed set of popular landmarks, buildings concentrated in hip districts, or storefronts of sponsoring companies correspond with notions of exploration-as-tourism, advertising, and brand recognition rather than opportunities to truly re-imagine and re-program how a city could be. The Urban Space Program framework includes user interface elements that simplify the process of capturing imagery from a mobile device, processing it for later recognition, and integrating user-captured facades into the database for later retrieval. Of course, the system designer could always choose to exclude these interfaces from their application, but their presence in the framework and presentation as end-user tools rather than developers' utilities suggests that they be included as a sort of meta-game that expands the frontiers of where a particular program can be used.

Finally, if this framework is to connect with a relevant audience of developers, it should tie into existing tools that creative coders are familiar with. Urban Space Program fulfills the role of figuring out where to draw an augmented overlay, but not how or what to draw on top of the live video feed. This latter task is handled by a rendering engine. Conveniently, the creative code community is in many ways defined by the rendering engines it collectively tends to use. Community websites like CreativeApplications.net tag projects according to the rendering framework they use, similar to the way traditional artwork is categorized by material. Tools like Processing, [11] OpenFrameworks, [12] and Cinder [13] are common choices for a growing number of artists and designers. Whereas many rendering engines are set up to produce mainstream video game graphics, the tools for creative coders encourage interactive generative design and abstract visualization of data. Very different results are obtained when images are programmed rather than modeled. Integrating Urban Space Program with these other frameworks will hopefully lead to fresh perspectives on how our cities might function and change beyond the well established modes of representing spaces in photorealistic 3D.

Future Spaces

The Urban Space Program framework represents just one possible way to explore the programmability of space. Augmented reality clearly captures the notion that the image of a place could be altered, though it does little to immediately effect the tangible components of a place. Questions of materiality require other means of investigation. As a software-based media, AR inherently engages with processes and algorithms as a method of producing images, though actually reprogramming the dynamics of an urban environment may call for other interventions. An application that is at its core algorithmic could

hide nonlinear processes and data behind a linear presentation method, playing back fixed narratives rather than the branching paths of participation proposed by the mid-century avant-garde. Gaming is a broad category covering numerous ludic activities and discerning exactly which mechanics can best transform contemporary urban spaces is another field of inquiry in itself. Urban Space Program does not attempt to resolve all these issues. Rather it is an attempt to reconcile present technologies with past philosophies of space to not only speculate, but actively create possibilities for the near future.

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METAFACTION AND THE RHETORIC OF ERROR – AN APPROACH TO ADAPTIVE PERSUASIVE CONFLICT GENERATION

Daniela Kuka

With 'metaFACTION' we invent an experimental semantic tool for critical discourse representation and nonfictional storytelling. Based on our Persuasive Conflict Generation Model, we establish an adaptive documentary style to help people gain alternative access to the structure and mutations of public discourse. Paradoxically, metaFACTION makes use of an error-friendly rhetoric – on a meta-level – as a means of shaping democratic communication.

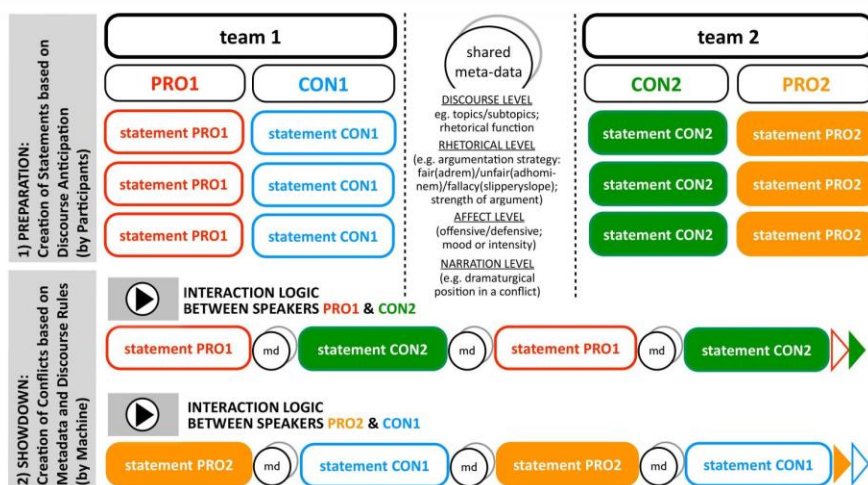


Fig. 1. Exemplary workflow of the formalisation of dialogues with conflicting viewpoints, Meta-Dating II Persuasion, 2010, Klaus Gasteier & Daniela Kuka, Schematic representation, Copyright by the authors.

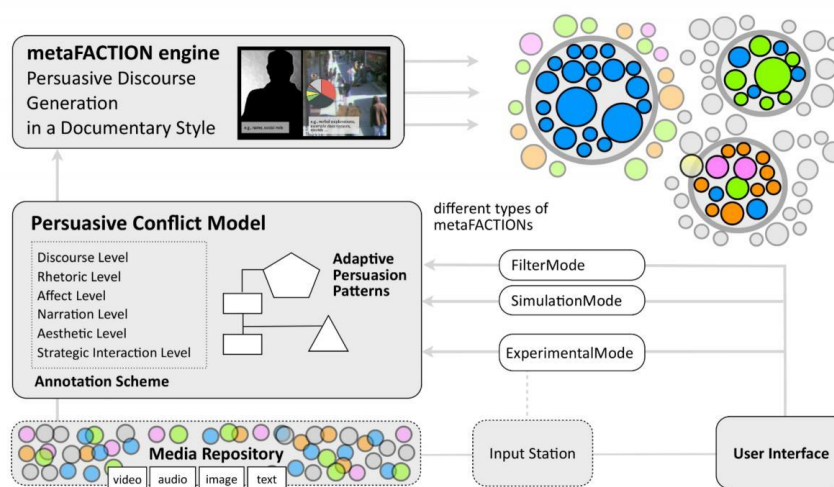


Fig. 2. metaFACTION, 2011, Daniela Kuka, System draft design (representation of filtered versions of mF-documentary following the style of 'filter bubbles'[2]), Copyright by the author.

Imagine we could generate informative and entertaining conflicts from digital resources of discourse such as online magazines, wikis, news portals, blogs, etc. Imagine we could receive them as personalised documentaries instead of lists of articles, references, links and comments – e.g., as simulated panel discussions, TV debates or just everyday conflicts. Imagine fragments of discourse were attracting other fragments of discourse in a dialectical manner, and they would automatically arrange as we are participating in a never-ending global conference ...

Semantic Media shape the way we produce, spread and receive public discourse. Given that discourses in digital archives and the World Wide Web are organised in a nonlinear fashion, we need to conceive of new methods and design approaches to create adaptive representations of topics of societal relevance. With 'metaFACTION' we invent an experimental semantic tool to capture, structure, and reorganise discourse fragments in such a way that informative and entertaining media products with different communicative goals for heterogeneous publics emerge. Combining structural knowledge from Automatic Video Generation, Discourse Analysis and Argument Processing as well as Story Generation with empirically validated patterns to describe natural situations of human dispute or conflict, we suggest the Persuasive Conflict Generation Model. metaFACTION, based on this model, is a conflict machine to create and present divergent and even contradictory discursive formations from a pool of annotated media fragments. The resulting conflicts are contextualised in a documentary-like genre model (documentary films as they are assumed to be persuasive) so that naturally unstructured discourse can be transformed into a semantically enhanced media experience. What is paradoxical about metaFACTION is not so much its capability to contradict itself in a plausible manner, but the targeted use of errors as a means of shaping communication.

The first two sections of the paper discuss current effects from the semantic web as they influence the vision and concept of metaFACTION. The third and fourth section describe metaFACTION with regards to its specific documentary generation approach.

A New Kind of Democratic Communication?

metaFACTION addresses a new wave of internet criticism associated with authors like Cass R. Sunstein, Jaron Lanier, Dean Eckles, and others. In 2010, Eli Pariser introduced the metaphorical term "online filter bubble" to describe how personalised search algorithms start to control how information is presented "increasingly biased to share our own views:"

With Google personalized for everyone, the query 'stem cells' might produce diametrically opposed results for scientists who support stem cell research and activists who oppose it. 'Proof of climate change' might turn up different results for an environmentalist activist and an oil company executive. [...] More and more, your computer monitor is a kind of one-way-mirror, reflecting your own interests while algorithmic observers watch what you click. [1]

What seems to establish from that is a "friendly world syndrome" with "false consensus effects," [2] a hegemonial discourse frame that is immune against critique, irritation, provocation, or alienation, but whose plausibility is always assured in advance owing to the comfortable avoidance of cognitive dissonance. Following Pariser, personalised discourse filters create an intransparent You-Loop around us, a landscape of automated censorship which, paradoxically, is both a black box and generated by our own online activities. Aggregation services and filter algorithms are challenged to cope effectively with an

existing deluge of data that has reached a level of complexity unmanageable by human capacities (cognitive, economic). But can such algorithms be neutral and democratic? They are not simply there to create order and meaning; they are always a step ahead of our decision-making faculty by autonomously selecting, weighting, and evaluating data. They simulate coherence, completeness, and context based on familiar paradigms of reception such as hierarchical, topographical, or chronological order. Behind that simulated order, a new kind of order is emerging: According to "The Order of Things" described by Michel Foucault in 1966, [3] we call it "The Order of Media" which means that there are now semantic concepts and algorithms that govern the production of knowledge and, as a result, people's understanding of the world, their attitudes and behavior.

Digistemes & Unfair Machines

Consequently, in such an "Order of Media" the authors of ontologies and algorithms become the new designers of, again in Foucault's sense, "epistemes", the rules to produce and spread legitimate truths. While semantic concepts determine if and how an object can be described to become part of an order, and if and how it can be related to other objects, algorithms determine how we can access these objects both on general and on personalised paths. This interplay builds a new set of rules to deal with scientific knowledge, cultural artifacts, news, and so on. To adequately describe this phenomenon we invent the term "digistemes". Digistemes are the self-logic of the semantic media dispositif, [4] a highly complex and intransparent set of rules that, on the one hand, allows to produce, distribute and access knowledge. On the other hand, they cause the spread of parallel universes full of zombie discourse, a hidden landscape of disordered unaccessible media fragments. An auto-persuasive human machine network is emerging, a system in which everyone is free to publish anything, but where they cannot or may not see and read everything. Which mutations of a discourse are transformed into zombie data is determined by their capability to provide relevant meta-data to sever the tentacles of semantic search. Otherwise, they remain unable to appear as part of any public discourse.

Thus, digistemes make it appear conceivable that a machine may be capable of automatically generating discourse representations on an arbitrarily chosen topic, using certain pieces of meta-information and coded discourse rules. But should the machine support every user's mindset by adjusting its discourse position to his/her profile? If we intend to use the power of semantic media technology democratically, we have to learn how to use its tools against their own logic (the creation of filtered worldviews). We have to learn how to strategically cooperate with what may be unfair machines (without even knowing if they are). metaFACTION is an attempt: By thinking errors on the meta-(information-)level.

Machine Generated Conflicts

Relevant insights for the research and development process were made possible by a pre-project "Meta-Dating". Meta-Dating is a conception and design project initiated in 2009 by Klaus Gasteier, Professor of New Media at the Berlin University of the Arts. The original idea was to generate plausible conversations about everyday topics from a pool of annotated video clips, based on a collaboratively generated meta-data scheme. Since then this evolved, now as a cooperation, into an experimental environment for non-linear persuasive communication, and a coming series of new approaches. In a team effort, students produce several hundred video clips dealing with anticipatable aspects of a controversial topic of their choice. Having agreed on meta-data that describe argumentative contents, strategies and discourse rules (later transformed to machine-readable algorithms by a programming professional), each team

splits into two subgroups which then develop content for the conflicting viewpoints (taking up both positions in the argument) in complete autonomy, cf. Fig. 1. The project moves a step beyond traditional debating contests: Each subgroup has to anticipate arguments and argumentation strategies for both the pro and con positions as well as patterns of strategic and tactical interaction between the two parties in an ongoing conflict (reaction/action). The computer program then generates the automatic debate (one version of many possible ones). While preparing the needed material the aim is not to anticipate and plan for all possible dialogue constellations, but to find a formalisation model that also supports unforeseeable turns in the final stages. The plausibility and authenticity of the course the conflict takes shows whether or not the model is working.

Persuasive Conflict Generation

To date, Meta-Dating experiments have been focusing above all on a free definition of description parameters and patterns for each project. A theory-driven modelling of argumentation or discourse structures or narration was deliberately avoided in order to simulate seemingly natural dialogues with high flexibility to test different solutions. metaFACTION builds on these experiences and introduces, in contrast to existing approaches in automatic documentary creation [5, 6, 7] and dialectical argument modelling, [8] an approach to model adaptive persuasive communication on natural conflict analysis in human communication. The following paragraphs give a short overview on the main features, cf. Fig. 2.

USER MODELS FOR NONLINEAR PERSUASION

Existing argumentation and persuasion machines do hardly consider that statements have different relevance to different users and that different ways to present a statement affect their persuasive power. metaFACTION follows a "mind opener" approach to documentary [9] combined with user models to generate persuasive mutations of discourse. On this level, we need two different types of meta-data with strategic relevance: a) Meta-data used to direct the dialectical process of two or more parties in order to create a plausible dramaturgy of conflict, e.g., institutional (expert-to-expert/expert-to-layman/layman-to-layman) and social (activist-nihilist/optimist-pessimist) relationships, modes of reaction (offensive/defensive/reflexive), strength of arguments, level of affective involvement (neutral/angry/unsettled); b) Meta-information relevant to personalisation based on user models, e.g., speakers' credibility in different contexts and milieus, speakers' similarity (optimistic/pessimistic, economist/ecologist, manager/mother), values addressed, and so forth.

NATURAL PERSUASIVE CONFLICTS

Related approaches that encode rhetorical patterns are based on formal argument and argumentation scheme modelling. [7, 8] Their insights are integrated in the Persuasive Conflict Generation Model, but we need further approaches to compensate that they create unnatural discourse structures which (1) are hard to capture from organically growing discourse, (2) cannot be used as model for the creation of a whole documentary experience, which consists of a wide range of verbal discourse and visual representations in a dramaturgically relevant order, and (3) are ignorant to the fact that human opinion-making processes do not exclusively rely on logical argumentation. In everyday life, we are affected by personal experience and emotionally intense stories, different hierarchies of values, more or less powerful opinion leaders in our community, misunderstandings, unfair rhetoric, etc. For this part, metaFACTION creates an approach to model human discourse on patterns of natural conflicts as they dominate, e.g.,

panel discussions, TV debates, or spontaneous conflicts in social contexts. Formal Models describing discourse and story structures add parameters and concepts in order to realise a documentary style that is driven by dramaturgical courses of conflict.

OPEN-ENDED PRODUCTION

The related project Terminal Time [6] encodes ideological patterns instead of formal argumentation, but it operates as closed systems. Based on transparent annotation schemes and scalable conflict rules, metaFACTION supports unmoderated peer production on topics of societal relevance. It has to be determined whether sets of meta-data can function as a universal language for micro-storyboards and/or as global stage directions so that anonymous and heterogeneous groups of authors add and annotate found footage or their own statements to create unwritten, typically contradictory, and evolving conflicts.

RHETORIC OF ERROR

Existing approaches try to avoid or minimize errors, e.g., argumentation tools that support decision-making and opinion-making processes. metaFACTION tries to generate a more experimental form of discourse representation. Human beings do not communicate in the mode of formal argumentation. Instead, social communication is context-sensitive and realised in dialectical loops which are rarely free from misunderstandings, coherence gaps, evasion and rapid shifts from topic to topic. More or less unconsciously, we bridge gaps and accept media disruptions, we oversee unfair rhetoric and fallacies, we familiarise with ruptures and lacunae as they are popularised by postmodern film aesthetics and fragmented internet communication. How could our habitual readiness to allow for errors and imprecisions of communication be utilised in a way that enables the manipulation of discourse? We suggest a sense-making false-connections approach allowing metaFACTION to repeatedly generate new arrangements of available media fragments and, therefore, also new statements without paying attention to the primary material's context or intention. Different manipulative principles of montage (known from documentary film theory) are used to build statements and clusters of statements that serve the user. The annotation schemes allow to index media fragments in such a way that they may appear in different, even completely foreign contexts (e.g., by multiple annotations on the discourse level such as science, media, politics, economy, education, ethics, medicine, aesthetics, and everyday life), and also lead to different statements when combined with other media fragments (e.g., by using bipolar fragments that change their polarity depending on their context of use (Kuleschow effect), or by omissions, by polysemy, by framed de- and recontextualisation such as quotation or parody, and by augmenting different context information). As persuasive patterns, we build on psychological and social effects in conflicts such as, e.g., "create fear," "evoke sympathy," "demonstrate authority," or "provoke moral concerns." They can be fulfilled by employing rhetorical tactics such as "quote an expert," "build a positive/negative analogy," "show great/terrible consequences," "tell a story of success/failure," "broaden the topic," "show pleasant/dissuasive example," "attack trustworthiness of counterpart," and so forth.

METAFACION MODES

The stimulation of the user can occur in three modes. The FilterMode creates a coherent documentary that serves the user's (anticipated) mindset. The SimulationMode allows users to deliberately manipulate the persuasive logic of the engine via an interface. Users can thus playfully experience in this way

how discursive formations and resulting statements are controlled without interfering with existing content. The ExperimentalMode generates documentaries that deliberately infringe discourse and genre rules and thereby open up improbable formations for simulation (e.g., counter-discourses suppressed by mass media, untypical speaker constellations).

Outcome & Future Prospects

metaFACTION allows to simulate different kinds of persuasive conflicts. Resulting media products can be manipulative, entertaining, provoking, or just irritating. Thanks to an error-friendly rhetoric on a meta-level, metaFACTION can serve as a powerful tool for critical discourse representation and nonfictional storytelling. We suggest using the Persuasive Conflict Generation model to establish a new documentary style to help people gain alternative access to the structure and mutations of public discourse in the third generation of the Internet. We are currently working with a prototype version that is to be developed further as an online application.

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CORPOREAL EXPERIENCE IN VIRTUAL REALITY

Merve Kurt

This paper will discuss the status of body and corporeal experience in the context of new media art, especially through the virtual works of art that involve digital interactivity and immersion. I will argue that an alternative understanding of aesthetics is needed in art historical and theoretical studies because the experience of virtual reality through new media art reappraise our ways of thinking about pictures and images.

This paper outlines a few ideas about the nature of a new kind of interaction with the art works: an interaction in a bodily way with digital works. This experience is made possible via real-time interactive 3D computer graphics and the resulting enveloping space is called virtual reality. I will argue that an alternative understanding of aesthetics is needed in art historical and theoretical studies because the experience of virtual reality through new media art reappraise our ways of thinking about pictures and images.

To get a clear picture of the notion of virtual reality one should begin with its possible definitions. During my researches, I have realized that there are three different use of the term, corresponding to three different disciplines: science (more specifically optics), philosophy and arts of computer generated imagery. Used in optics, the virtual reality signifies a mirror image. In this context, this term could be substituted with optical illusion. In philosophy, it is defined either as a potentiality in the Aristotelian sense or a hidden, a non-obvious presence in the actual reality. Though in the first context the virtuality is the contrary of actuality and in the second it is already in the actual, both of these definitions accept that the virtual is in the order of reality and it is not its contrary. It is necessary to underline this attribute of the virtual because mostly in the commonsensical thinking we tend to say that if something has a quality of virtuality then it is not real. Yet, it is important to appreciate that virtuality is a part of reality since there is really a virtual reality. And today, when we talk about virtual reality, it has a specific meaning: interactive simulation systems created through computer based three-dimensional imagery. In this paper, we'll use the term in its third sense when referring to virtual reality in digital art.

When we move to the definition of virtual body, we find two different categories. In the field of literary fiction and its declension in films, it is a question of cyber bodies or bodies set free from all material limits. And in the universe of computers, it is a question of a body modelled or moulded by three-dimensional computer graphics, a body immersed in a computer-generated world where a perceptually encompassing environment is created. This experience is promoted either through use of an interactive screen or with head mounted displays combined with haptic and vestibular displays. This device enables the user to complete, extend and reproduce the reality. I'll treat the question of virtual body as it is defined in the second category, meaning as an immersion in an enveloping space created by digital art works.

I disregard if it is an disembodied experience like in the works of Jeffrey Shaw, namely *Place :Ruhr*, or an embodied one like the *Osmose* of Charlotte Davies because in both cases, the body incorporates into images, live them from an intrinsic point of view which could break out the rules of Euclidean space and

the Cartesian understanding of spatiotemporality. Hence this new way of experiencing images arises new phenomenological and aesthetical questions.

In Jeffrey Shaw's *Place: Ruhr* (2000), which is an example for the disembodied experience, a rotating platform allows the viewer to interactively rotate a projected image within a large circular projection screen and explore a three dimensional virtual environment. A device on the platform designed as an interactive user interface, with its buttons and handling, allows the viewer to control his movement through the virtual scene. It enables the rotation of the platform and of the image around the circular screen. The field of exploration is open to other sensory organs than the eye: the spectator uses the virtuosity of his/her fingers, gestures and synchronizes his/her movements with the speed of moving images. The hand wins a control function and the eye interacts with it in order to enter the virtual world. Movement of the body from the physical environment to the space of virtual images is accompanied by a sense of continuity that partially masks the difference between physical and virtual space. The ability to move in the space of images doubles the movements of images on the circular screen. Anne-Marie Duguet mentions that in Jeffrey Shaw's works;

The user enters in spaces without any point of reference, in times without direction and in adjustable speeds. He is both on the stage and out of it. He conceives here and there at the same time. [1]

So the aesthetic experience does not remain only as contemplation, but gains a sensitive and cognitive aspect. We can literally say that the audience becomes one with the work and s/he touches the image. Thus, the interactive device allows participation to an unprecedented and multisensorial experience.

To have an idea about the embodied experience within the virtual universe, *Osmose*, the three dimensional installation of Charlotte Davies, is a good one. Davies, a Canadian artist and the director of Visual Research at SoftImage creates *Osmose* in 1995. She builds twelve natural worlds with the themes like landscape, earth or interior view of a body where it is possible to be immersed and to move with the help of a head mounted display and sensors that capture the respiration and the movements of the user. Immersants are placed in *Osmose* for fifteen-minute sessions. In her paper « Techne as Poiesis : Seeking Virtual Ground » Davies speaks of *Osmose* as being a poesis or bringing forth, revealing our being in the world. The prime navigation tool is the breath. Stephen Jones, when describing his experience in *Osmose*, writes:

On breathing in, one rises through the virtual worlds ; on breathing out, one sinks slowly into deeper realms until one gets down to the core machine-code world. The participant gains a sense of being removed from the everyday world and immersed in some environment that does not necessarily behave according to the rules of the known. [2] Davies explains the audience impact of her immersive virtual artwork:

... judging from the participant response, immersion in *Osmose* appears to temporarily suspend some people's capacity for rational thought and conversation. For many, it is an emotional, even euphoric, experience. People feel free of their bodies and yet, paradoxically, grounded in them at the same time. Some feel an intense sense of loss when the immersive session is ending, and even cry afterwards. [3]

With *Osmose*, one have a better understanding of the virtual space and time which operate under laws other than those belonging to the real world. In addition to these characteristics, the digital images in

contrast to traditional ones do not have a fixed or mobile medium as they are immaterial in their electronic form.

Following these examples, we may say that virtual worlds are non-spaces, which do not exist, in our everyday reality. Yet our bodies in these non-spaces can never be non-bodies. This confrontation between non-spaces and real bodies is the core of the question of the corporeal experience in the virtual. At this point I'd like to analyze its conceptual and sensorial consequences of this confrontation from two perspectives, not so sharply distinct from each other : phenomenological and aesthetical.

What is at issue here, from a phenomenological framework is, as art historian Suzanne Ackers suggests, « Renaissance perspective is displaced, and we are learning new ways of seeing, navigating in new kinds of conceptual space. Our perception of time and space becomes a virtual knowledge, no longer fixed to the Cartesian frame.» [4] So we are placed in an original situation where we can perceive physically a theoretical model and in practice act on its intelligible structure but in a reciprocal way this mediation allows us to think, in other words to understand abstractly and categorically physical sensations and configurations of stimulus sensorial. Henceforth, they offer the possibility to cut ourselves off from the world, not in order to retire but to understand it better, to grab its essence. So, the virtual body is not, as it is commonly thought, a body without corporeal envelope, without weakness, just a body of pleasure. But it is rather a body, which would have the chance to ask itself the question of the man, his status and also his own limits. The virtual reality permits to witness the boundaries of reality through an other form. In a phenomenological context, if we refer to Merleau-Ponty, the body grasps its own immediate knowledge by jutting into the fabric of experimental space and time. And since the experience of space and time changes within virtual environments, we can not speak of body image as a stable entity in virtual installations, therefore we should reconsider it: Is it possible to conceive a phenomenological experience of a new order ? If so, to what extent these new sensations and perceptions would change the phenomenological studies ? These questions could be considered as a basis for a phenomenological theory that remains to be founded.

To experience the visual, aural and interactive aesthetics of the work, we don't really leave our physical bodies but we leave it in an imaginative way. Philippe Quéau, a contemporary French scholar and Fred Forest both artist and art theorist who made a great contribution to the literature of the virtual, announce that the virtual is the vertigo of the abyss. Quéau explains that in German, the abyss is *Abgrund*, which is the contrary of *Grund*, the base but also the reason, as Heidegger reminds us. If the virtual worlds excite us it is because they create a sense of vertigo, an emotion of abyss, we are leaving the reason. [5] Virtual installations, by enabling people to experience the unusual sensations of seeing and floating through things, changing them, living them from inside, make them get free of their usual, habitual ways of being in the world. So, as our physical appropriation to the art work, our emotional, sensitive and intellectual relation are deeply modified, we should bring forth a new theory of aesthetics. It would be an ignorant mistake to place new media art in the historical continuity of artistic movements related to contemporary art. We should face the question of digital arts as we do in the scientific domains when confronted with a genuine epistemological breakdown. New media creates an exciting occasion to raise broader questions in art theory, philosophy of art, phenomenology and even in epistemology.

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ORIGINS OF JAPANESE MEDIA ART – ARTISTS EMBRACING TECHNOLOGY FROM 1950S TO EARLY 1970S

Machiko Kusahara

INTRODUCTION

This paper excavates and analyzes works of Japanese artists from 1950s to early 1970s that anticipated media art to come, with original ideas and innovative use of technology.

It is never clear when and where “media art” started. However, it is important to trace back its history and examine what may be called “pre media art” in order to better understand media art today. By exploring postwar Japanese art history retrospectively from today’s media art point of view, elements that have been neglected or put aside can be rediscovered with different meanings.

HISTORICAL AND CULTURAL BACKGROUNDS

In order to analyze their relationship to technology it is important to understand the historical and cultural background. Japanese postwar avant-garde artists emerged from a specific situation when the value system went through a drastic change in a short period. Nationalistic ideology that the government had successfully established since Meiji Restoration in 1868 collapsed with two atomic bombs and the occupation that followed. The defeat meant liberation from the exclusionist doctrine that practically banned anything Western or international and praised “Japanese spirit” (yamato-damashii) as the winning force. The American occupation forces overwhelmed the Japanese with their material and technical superiority. To many Japanese it became clear that spiritualism alone could not compete against the power of technology. Interestingly similar to what happened less than a century earlier, Japan was determined to catch up by focusing at science and technology, transforming itself into an industrial country.

However, ultranationalism was not a Japanese tradition. Before the war, especially in the 1910s and 20s, lively urban culture prospered with real-time influence from Europe and America. New trends and movements were introduced in real time. Dadaist movement was introduced in 1920 and had a strong impact especially on poets. A group of artists founded MAVO in 1923 with publication and activities that encompassed a wider field including art, design, theatre, architecture, among others. Surrealism was introduced in late 1920s by poets, theorists and artists including Shuzo Takiguchi, who later led Jikken Kobo (Experimental Workshop) in the postwar period. In music jazz, French chanson and European classic music were popular numbers for gramophone and radio. In less than half a century since Japan opened its border to the world with Meiji Restoration and launched an accelerated modernization, Western culture was already integrated in urban life.

However, the occupation of Manchuria in 1931 and invasion to China that followed put an end to the liberal and international atmosphere. By 1940 cultural figures who were active abroad including the painter Taro Okamoto were forced back to Japan. In 1941 Takiguchi and a Surrealist painter Ichiro

Fukuda were arrested for a groundless suspect that avant-garde artists were involved in the international communist movement. Any cultural activities that looked “western” would be considered suspicious. In the daily life use of English was banned, as well as listening to British, French or American music. Painters -- both in Western style (yo-ga) and Japanese style (nihon-ga) -- willingly or reluctantly painted war propaganda. As war situation got worse metal objects -- anything from statues and temple bells to “unnecessary” machines, toys, kitchen utensils, etc. - were collected to be recycled for army use. Women and children were trained to fight using bamboo spears. To compensate the lack of arms and daily commodities the authority promoted the idea of superiority of spiritual strength over material power.

When the war ended in 1945 with two atomic bombs that exploded over the cities of Hiroshima and Nagasaki, it was natural that awe for the power of science and technology came back, with a hope to catch up the world standard. New companies emerged right after the war founded by engineers who had fresh ideas that could not have been realized during the war. Sony, for example, was established in 1946 and its products played an important role in avant-garde art. Japanese love for technology is a widely known cliché, but in fact curiosity for new things among Japanese had been reported by foreign visitors over centuries.

JIKKEN KOBO (EXPERIMENTAL WORKSHOP, 1951-1957)

Without doubt Jikken Kobo was the most experimental and technologically advanced group of artists in the 1950s Japan. Aforementioned Shuzo Takiguchi played a leading role both as a theorist and a poet in re-launching contemporary art, attracting young artists, poets and composers around him. Consequently Jikken Kobo was formed in 1951 with a multimedia ballet performance titled “Picasso, le Joie de Vivre”. Inspired by a painting by Picasso, the stage set was designed by Shozo Kitadai and Katsuhiro Yamaguchi, costume designed by Hideko Fukushima, music composed by Hiroyoshi Suzuki and Toru Takemitsu, lighting designed by Naotsugu Imai - - as a collaboration of major members of the group. The choice of ballet as a form of collaboration was an homage to Dada’s and surrealist’s experimental ballet, from Francis Picabia, Erik Satie and others in 1920a to Jean Cocteau and Diaghilev, and further to American avant-garde scene with John Cage and Merce Cunningham. Helped by Takiguchi’s career and his worldwide network experiments by Jikken Kobo paced up with international movements in art.

For a self-taught composer Takemitsu who was severely rejected from the academic world at a competition the year before, Jikken Kobo was a place for unlimited experiments and multidimensional activities. Takemitsu became one of the main composers of the group and collaborated with other members such as Katsuhiro Yamaguchi for experimental theatres and performances.

Musique Concrète, which was originally developed by Pierre Schaeffer around 1950, was brought to Japan in 1953 by Toshiro Mayuzumi. Mayuzumi had graduated from Tokyo University of the Arts and studied at Conservatoire de Paris the year before. The new form of music based on magnetic tape recording technology was brought to the next level immediately by Takemitsu and his collaborators at Jikken Kobo. They expanded the concept of Musique Concrète to an audiovisual form that integrated latest electronic audiovisual technology of the time, rather than purely musical experiment. Sony’s Automatic Slide Projector system was just introduced as an educational device to synchronize a slide projector and a tape recorder. Combining Musique Concrète with slides created by artists and photographers, Jikken Kobo produced several “Auto Slide” works in 1953 with surrealistic imagery such as “Adventures

of the Eyes of Mr. Y.S., a Test Pilot” (composition by Katsuhiro Yamaguchi, music by Hiroyoshi Suzuki). The system was offered by Sony and the artists worked at Sony’s studio.

The incredible quickness with which Jikken Kobo artists grasped the possibilities brought by these new reproduction technologies and developed a new form of creation must be understood within the social context. An interest element in their activity is the combination of European and American influences. While Takiguchi In addition to aforementioned atmosphere of the era and a longer tradition of appreciating technology and new things in Japanese culture, the academism in art had not recovered yet. The fact that the major part of Jikken Kobo members did not have academic background probably helped them to think more freely.

Jikken Kobo members continued to be involved in experimenting new ideas and technology after the group diminished in 1957 after Takiguchi’s death and played major roles in the Osaka World Exposition in 1970, although it does not mean that they embraced technology without criticism. Ambivalence was felt widely among artists who had experimental approaches as in case of Osamu Tezuka who named his major robot character “Atom” (Astro Boy outside Japan) postwar Japan. Yet, as the title of the book “Robot Avant-garde” by Yamaguchi (1985) suggests, their curiosity toward technology and experimentalism shared by the Jikken Kobo members founded a basis for Japanese media art today.

PAINTING BY MACHINE

The Gutai artist Akira Kanayama is less known compared to his partner Atsuko Tanaka, the artist known for her “Electric Dress (1956), although the original use of technology and interest in materials that had not been traditionally used in art were shared among them. Kanayama helped Tanaka in realizing her ideas that involved technology such as her piece “Work (Bell)” (1955). Kanayama’s “Work” series produced mostly around 1957 involved a remote-controlled car with paint tanks he built himself, modifying a toy car. Kanayama tested a variety of crayons, markers, black and color ink with which the car scribbled or dripped while moving on large pieces of paper and later on white vinyl sheets, which he found the most appropriate for his purpose. While the artist operated the car on a sheet laid on the floor, its trajectory and the resulting traces of ink were never under the perfect control of the artist. Instead of directly employing one’s own body, as in case of other Gutai artists such as Kazuo Shiraga and Saburo Murakami, Kanayama used a mechanical medium and chance operation to draw lines. His use of plastic inflatables and footsteps on vinyl sheets in other works also suggest his positive interest in new materials, and mediated representation of body. However, when Gutai was “discovered” by the French critic / art dealer Michel Tapié and internationally introduced, these features of Kanayama’s works were disregarded. It is said that his “Work” series was interpreted as alike of Jackson Pollock’s “all-over” style in the art world outside Japan, neglecting the interesting questions that arose about originality and the role of technology in art.

Eventually Gutai artists including Tanaka shifted to “paintings” rather than three-dimensional works involving unusual medium. By the time when Gutai was invited to participate the 1970 World Exposition in Osaka, Kanayama and Tanaka left the group.

DOMESTIC AND INTERNATIONAL, POLITICAL AND NON-POLITICAL

It has been considered that the isolation from the international art world during the first years after the war helped giving birth to original and often extreme approaches by Gutai artists and by those who submitted to the annual Yomiuri Independent exhibition[1949–1963] including Neo-Dada artists. While the role of isolation was more obvious in case of Kyushu-ha, which was notorious for their wild junk artworks that contributed in putting an end to Yomiuri Independent, there existed multiple channels of information on movements in art.

Taro Okamoto, who had lived in Paris before the war and achieved recognition among surrealists and abstract painters, was most influential among the young postwar Japanese avant-garde artists. Okamoto's knowledge and understanding on avant-garde art combined with his interest in Japanese prehistoric Jomon sculptures created a complex effects on young artists, together with his Polarism (taikyoku-shugi) that regards contradictory ideas as the source of creation. Jiro Yoshihara, who founded Gutai in 1954, had access to the international art world, and communicated with his friends from the prewar period. Aforementioned Takiguchi kept communication with surrealists including Andre Breton、Marcel Duchamp, and László Moholy-Nagy. As Duchamp and Moholy-Nagy moved to the United States, Takiguchi's spectrum widened to the latest art movements in America. Another information source for some of the young artists including Yamaguchi was the library of the Occupation Force in central Tokyo. The library was open to everyone and had books on contemporary art. Using the still brand new LP record player, contemporary music was also presented. When America, especially New York, was becoming the center of the most experimental movements in visual art, music, and dance, such up-to-date information flow no doubt provided a ground for Tokyo-based artists and composers. It was missing from artists in other regions such as Gutai.

Another important issue in postwar art was politics. As the reaction to the wartime totalitarianism, movement for democracy and influence of communism widely spread, involving young artists. Struggles took place as the US government changed the policy before the end of the occupation and started oppressing leftist movements. The conflict continued in a greater scale in 1960 and in 1970, when the Treaty of Mutual Cooperation and Security between the United States and Japan was to be signed.

TECHNOLOGY AS A MEDIUM OF ART

What seems to be in common among artists such as Akira Kanayama, Atsuko Tanaka and Katsuhiro Yamaguchi is the conscious distance they kept from being trapped in domestic value system, and certain “coolness” in representing their concepts. Instead of being involved in “Japanese” aesthetics or local (i.e. Japanese) politics, or creating artworks that radiate strong messages, they used technology as a medium through which their ideas could be observed and enjoyed by others. Yamaguchi's “Vitrine” works offer different colors and patterns according to a viewer's position and movement. Kanayama's “Work” series is a whimsical experiment with a toy radio control car, which was an extremely popular hobby object of the time. By placing technology as a core part of their works, they opened up a new approach in art, consciously or unconsciously connecting the long tradition of “technology as entertainment” in Japan, and media art to come.

ENHANCING SPATIAL EXPERIENCES THROUGH DIGITALLY AUGMENTED SPACES:

Serhat Kut, Semra Aydinli & Arzu Erdem

This article will be discussing Augmented Reality in a trans-disciplinary approach to discuss the possibility of enhancing the experience of space through our bodies by augmenting it digitally in a 3d setting. The article will be searching for how could the experience of space enhanced digitally in terms of body-space interaction and what might be the consequences of this change.



The Library+ Project. Cybertectonics Of Space. Copyright: Serhat KUT.

Introduction

It has been two decades since Weiser had put forward the vision of Ubiquitous Computing in which he was foreseeing the shift away of computing from a desktop centered state towards a pervasive computing with smaller mobile devices distributed throughout the space (Weiser 1991). Today this vision is being realized with the emergence and pervasive use of tablet devices and smart phones connected wirelessly to public or private networks and each other as well. And supporting this vision, wearable computers and head mounted displays (HMD) has been much more accessible for end users in terms of price and ease of use.

The 1990s has been the era of virtual reality and most of the discussions in economy, politics, architecture and urban design theories were focused on the notion of cyberspace experience. However among the emerging new media and digital interaction technologies the Augmented Reality (AR) technology

enabling to overlay the digital information over the physical space is turning back the discussion on the physical space again. But this time a physical space which is augmented with dynamic digital media.

Cybertectonic Space

The term Augmented Reality is broadly being used for the Computer Vision technology which enables overlaying 3d registered digital dynamic media on physical space (Azuma 1997). But on the other hand in a wider perspective, in terms of spatial experience, any situation enhancing, transforming or manipulating our experience of space may be understood within the context of Augmented Reality. Emphasizing this point of view Manovich brings up the concept of Augmented Space, re-conceptualizing augmentation as an idea and cultural and aesthetic practice rather than as a technology (Manovich 2006).

In this perspective Augmented Space may be considered as a new space or transformation of the physical space with digitally overlaid data and even as a new realm providing a place for Being-in-the-world (Heidegger 1978). In another terms Augmented Space is a new realm containing virtual elements in a real physical space. Here reality and virtuality are not considered to be opposite concepts but they are viewed as lying on the opposite sides of the reality-virtuality continuum (Milgram et al. 1994) where Augmented Reality is located somewhere in-between.

Regarding McLuhan's perspective involving media as an extension of human body (McLuhan 1995) Augmented Reality can also be discussed as a new medium extending our bodies and therefore providing new possibilities of space experience. And from now on to pull back the attention from the computer vision technology to architectural domain, the new in-between space experience made possible by Augmented Reality will be called as cybertectonic experience, coining the words cybernetics/cyberspace and architechtonics. And the new space produced via cybertectonic experience will be called as cybertectonic space.

Within this context it might be concluded that Augmented Reality is not just a Computer Vision technology providing possibilities for overlaying digital media on physical space but more than that Augmented Reality is a concept strictly related with spatial experience and bodily perception and therefore in an ontological perspective it provides a new in-between place in the continuum of real and virtual and thus resulting a new problematic domain in Architecture that should carefully be considered. This new problematic domain might be a ground for understanding the structure and qualities of cybertectonic experience and how cybertectonic space is produced.

Library+

The Library+ project is a pilot study that has been experimented with undergraduate architecture students of Istanbul Kultur University Department of Architecture at the main campus library. The main goal of the project was to create an Augmented Reality scene in the conventional setting of a library by overlaying digital information over the physical space to provide a new realm for cybertectonic experience and observe, discuss and evaluate possibilities of cybertectonic space in an architectural point of view.

The hardware used in the project was a backpack system consisting of a laptop computer and a Head Mounted Display and the open source AMIRE marker tracking based augmented and mixed reality authoring tool has been used as software. Marker based augmented reality authoring software makes it possible get much more precisely set scenes in the physical space than gps based systems and yet easier to install and setup compared to RFid tag based systems since the only thing needed to register any digital object in the physical space are black and white patterns printed on papers which are called markers. AMIRE, not only making possible to overlay digital data on physical space but it also allows yo to design some interactive scenes according to parameters like distance of the body from the digital object, distance between two objects and markers and some logical operators like if and then. With all these parameters much more interactive cybertectonic spaces could be created and this interaction is not just pressing buttons and triggering some events more than that and most importantly the scene is interactively constructed based on body gestures and the movement in space, turning around objects, bending over and etc.

Therefore the cybertectonic library space is not only a physical space ornamented with digital media, it's a space which is open to interact with, a space that encourages bodily perception (Merleau-Ponty 1996) of the digital, which is intensively connected to or extending the physical.

Concluding Observations

We have experienced that Library+ offers a completely new library experience rather than searching the catalogs in the computers and accordingly finding the books in the appropriate shelves and reading them eventually. The space encourages one to discover the library space and reveal the hidden information between shelves or books and leading him or her to possibly unexpected results or experiences. The cybertectonic space of the Library+ changes the linear and usual process of research or reading experience happening in a library and we have also observed that the movement of the body dramatically changes in the cybertectonic library experience as expected.

Supporting the cybrid principles that Anders has mentioned earlier (Anders 2008) we have found that reciprocity between the physical and the virtual elements of cybertectonic space is an essential issue which should be undertaken as a key principle when creating cybertectonic experiences. Otherwise, the weak relationship of physical space with the digital content may prevent to create meaningful cybertectonic experiences when aiming to enhance the experience of space.

As a conclusion it could be told that Augmented Reality technology brings up a new problematic domain in to Architecture that should be discussed in terms of experience of space. The cybertectonic space is capable to change the conventional experience of space and therefore as an extension of our bodies it is letting us to have new experiences of space, leading us to get in a new ontological state of Being. With the emergence of smart phones and tablets, the concept of ubiquitous computing has the potential to create ubiquitous cybertectonic experiences and we believe that further work in architectural domain is essential to understand and interpret the cybertectonics of space.

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REPUBLIC OF THE MOON - A NEW ARTISTS AUTONOMOUS TERRITORY

ROB LA FRENAIS

How will we live on the Moon? Despite long-term plans to send humans to Mars, in the short term the Moon is the most likely place to rehearse living away from the Earth. Republic of the Moon discusses possibilities for artists' autonomous solutions.



Agnes Meyer-Brandis training Moon Geese (courtesy the artist)

"Earth is the cradle of humanity, but one cannot live in a cradle forever" - Konstantin Eduardovich Tsiolkovsky, 1911

In two months time from the writing of this paper 6 people (all men) will emerge from a 'wood panelled spacecraft' at the Institute of Biomedical problems in Moscow. This will be the conclusion of Mars 500, an attempt to simulate the logistics, psychology and monotony involved in a mission to Mars. This is the most ambitious of the analogue environments that have been designed on earth to investigate the human factors in long-term space travel – previously the Mars Desert Research station in Utah has been used to rehearse life on Mars complete with space-suited expeditions from a habitat into the desert.

But it is still likely that any long-term attempt to live off the planet will be on the Earth's Moon, only 3 days away by rocket, although reachable over a longer period by electric-powered spacecraft such as the European Space Agency's SMART vehicle, eventually orbiting the Moon. So, despite long-term plans to send humans to Mars, in the short term the Moon is the most likely place to rehearse living away from the Earth. It is envisaged that sooner or later a small outpost of humans and robots will be established, possibly living in tunnels drilled under the Moon's surface and quite possibly established by emerging superpowers such as China or India on the South Pole of the Moon where water ice is expected to be found. So how might we respond to this new territory, which technically belongs to everyone?

The idea of humans living away from the Earth's regular infrastructures also gives rise to alternative thinking about issues such as sustainability, human psychological factors and governance. The recent movie 'Moon' worked on the dystopic basis that we might only wish to send clones to exploit the Moon industrially. But what if we were to apply new 'open source' thinking about collaboration between humans and technology to create a liveable solution for an off-planet habitat. Space architects and psychologists such as Regina Pelzsus (quoted below) are currently proposing new paradigms for dealing with issues such as monotony and governance and artists are beginning to propose new models for living off-world.

One strategy could be the pre-emptive setting up of a micronation which could claim the Moon independent of national or commercial interests. This strategy has already been used by artists such as Slovenia's Neue Slovenisch Kunst (NSK) who issued their own passports, the Danish group N55 or artists like Antti Laitinen. Alexandra Mir famously declared herself the 'First Woman on The Moon' on a Dutch beach. Other strategies are being proposed in the new Arts Catalyst project and exhibition 'Republic of the Moon'

The initial idea came from a recent International Astronautical Federation meeting in Paris attended by the exhibition curators, in which issues of space governance were discussed. A United Nations official with an interest in the peaceful uses of space stated at a private meeting "The last thing we want to propose is a Republic of the Moon". We wondered: why not? So we propose to set up, in advance, an artist's micronation- a Republic of the Moon and will communicate with specific artists and groups inviting them to participate, to start thinking about methods of governance, diplomacy and autonomy of this future artist's territory.

Regina Peldzsus is working with the internationally acclaimed artist and architect Tomas Saraceno to build an environment which will challenge a group of 20 volunteers to live for 20 days in a moving spherical module in which they will work, eat, socialise and sleep, but which has no 'up' or 'down' at any one time.

Saraceno, who has created the major exhibition 'Cloud Cities' currently showing as a one-person show in the main hall at the Hamburger Bahnhof, is a latter-day follower of Buckminster Fuller, following the dictum 'There are no passengers on Spaceship Earth, only crew'. His installation forces the viewer to become a participant in a different way, raised above the ground in semi-stable inflatable structures and become a physical metaphor for collaboration.

Peldzsus has written a short summary of the objectives of such a project:

"The conditions in an isolated and confined environment such as a Moon base pose a range of psychological challenges to a group of astronauts. In terms of crew cohesion – which is vital for both physical and emotional survival in a hostile and remote location – this can include social monotony, clique building, personal withdrawal and aggravation of interpersonal tension. [1, 2] Leadership becomes a crucial concept in ensuring harmonious and successful co-habitation [3] and, in a broader sense, represents or challenges models of governance on Earth.

As a central part of the programme of Republic of the Moon, a simulation of a Moon mission is proposed. It involves three groups of participants who help design, man and operate the base for the dura-

tion of the exhibition. A DIY Lunar Base will feature all necessary habitability aspects such as sleep stations, galley, windows, greenhouse, hygiene facilities, storage room, work lab, space suits and maybe even an exploration vehicle.

Space analogue studies and ground simulations are an essential – albeit expensive – component of research activities in the scientific spaceflight community. In the light of future long duration missions, space agencies and independent institutes around the world are preparing. Examples include the Houghton Mars Project in the Canadian High Arctic, the Mars Desert Research Station in Utah (US), ESA's Concordia Research Station in Antarctica, and – most notably at the moment – the MARS500 simulation study at the Institute of Medical and Biological Problems in Moscow.

Staging a simulation in the framework of Republic of the Moon will not only deliver insights and firsthand experience to the participating audience, but inspire and inform a wider public on human aspects of long duration missions."

A different approach to the Republic of the Moon project has been that of the artist Agnes Meyer-Brandis, whose poetic-scientific investigations weave together fact, imagination, storytelling and myth, past, present and future. Her project 'cloud-core scanning' involved research taking samples from the centre of clouds in to zero gravity in a parabolic flight in order to test how they behave.

Meyer-Brandis weaves a narrative based on writings by Francis Godwin based on an excerpt from the book *The Man in the Moone*, written by the English bishop Francis Godwin in 1603. Godwin was the first person ever to describe weightlessness – long before Newton's theory of gravity. The protagonist in the book flies to the moon in a chariot towed by gansas birds, more commonly known as geese. These special moon geese migrate every year from the earth to the Moon.

Meyer-Brandis has actualised this concept has by breeding 11 geese at the artists residency in Pollinaria, Italy - imprinting them on herself as goose-mother, training them to fly and taking them on expeditions. All these geese have been named after famous astronauts and she is proposed to build a Moon analogue habitat for them in Southern Italy which would be operated, in the same way as human analogues, from a remote control room in Northern Europe as part of the Republic of the Moon project.

The context of many of these artists interventions reflecting on a moon colony is inspired by other projects that attempt to take on 'big' infrastructures such as the space industry and bring them down to a human-sized level.

In 2010 a workshop and conference was held at Newcastle University and the AV Festival to examine artists autonomous infrastructures in the light of a potential 'planetary breakdown' Following Helen and Newton Harrison's notion of the 'Force Majeure – that we should be preparing for different forms of governance following radical blows to the existing infrastructures by inevitable climate change – Autonomous Infrastructures looked at the many models created by artists and by communities of people operating semi-autonomously in society in intentional and utopian communities. It examines the symbolic nature of many of these initiatives and propose the future realisation of unrealised artists infrastructures. One of the projects coming out of this was the Train project by hehe, which although not part of Republic of the Moon, symbolised the approach to the subject.

The artist group hehe (Helen Evans and Heiko Hansen) uses minaturisation as a method of playful nuanced critical intervention and reflection around issues of sustainability, such as their recent work in Cambridge during 'Invisible Dust' and at Ars Electronica 'Is There a Horizon in the Deep Water?', which re-enacted the BP Oil Rig disaster on a small scale in a pool of water.

The Arts Catalyst is currently working with them on a long-term research project called Train, which takes the problem of locomotion as a starting point. The project develops autonomous one-person vehicles that operate temporarily, in the form of a performance, on unused or abandoned rail tracks. An example of such a "dislocation" is the vehicle Tapis Volant (Flying Carpet). The Flying Carpet, which runs along the historic tram track in central Istanbul, appears as a soft red cushion with beaded tassels dangling down from each of its sides, large enough for one person to sit comfortably. It runs along a tram track, using one of the rails as a monorail, it's wheels propelled by an electric motor. Underneath the cushion is an electro-mechanical system that allows the rider to advance whilst seated in a cross-legged posture. This body position not only mimics the way of sitting on a mythical flying carpet, but also gives the body a different inclination and state of mind, suggesting that that rider has to be grounded and balanced to ride this particular vehicle. In this project they use their indirect comment on environment to the issue of public transport versus the apparent freedom of the motor car.

Hehe has made a widely publicised work call 'Nuage Vert' or Green Cloud, in which factory emissions are monitored and dramatised by a live interactive laser illumination of the shape of the smoke emitting from a factory in Helsinki, and most recently an incinerator in St Ouen, Paris. While not directly taking on issues of space exploration, hehe's approach is an example of the symbolic power of artists intervention into large-scale infrastructure such as the space industry.

Space exploration is also too often seen to be the province of the US, Russia and Europe. But the some of the most recent launches have been from India, in the Chandrayaan programme. Rakesh Sharma, India's first astronaut, said that India was embarking on Moon exploration in order to be part of the conversation of the future of the Moon. "But who is part of that conversation, where does it happen, who is excluded and who ever hears it?" asks Joanna Griffin, who with artists from Srishti School of Art in Bangalore along with interested scientists from the Indian Space Research Organisation (ISRO) are creating an open forum where meanings of the moon in culture and meanings of the moon to scientific projects, can be discussed, in the project Moon Vehicle.

Moon Vehicle will look at what is discussed in relation to the Moon in order to transport points of view – commonality and difference. To demonstrate to the small community deciding the future of the moon that they have responsibility towards cultures they do not know. The project is conceived as a perspective-altering exercise. The live image of the Moon will be projected from a telescope onto the ground, creating a new poetics that encourages people to think about the relevance of the Moon to our lives and the earth in new ways. It is a performance space, a storytelling space, a play space and a debating space Joanna Griffin: "It's been a way to bring people into a circle to talk about the moon. It does this really poetic thing of 'earthing' the moon so you look down instead of up and think differently We've tried to bring people from different walks of life to talk about the meaning of the moon to them. We've tried to have it as something non-hierarchical, so not just about 'experts' It's something kids absolutely love to play in."

So why this moon? And why humans? Andy Gracie, working on a project for a different moon that that of the Earth- Titan, the Moon of Saturn. His idea is to use DIY and bio-hacking approaches to creating the

atmosphere of that moon here on Earth, using everyday materials such as vodka and a bicycle pump and breed fruit flies in this environment to see if they would survive.

Gracie describes the project here: "The fruit fly *Drosophila melanogaster* has been used as a model organism since early 20th century and more recently has become a workhorse of space bioscience, having flown in biosatellites, space shuttles and space stations. Due to the 75% similarity of the *Drosophila* genome to our own, a range of experiments on this organism continue to inform us about the effects of radiation, microgravity and other space environmental factors on ourselves. Out of a wide range of experimental organisms it is the fruit fly which will arguably provide most of the data on how the human is expected to adapt to off-earth conditions.

Many scientists view Titan as an analogue to the early Earth, although the temperature is significantly lower. Some theorists cite Titan as a possible host for microbial life, or at the least as a prebiotic environment rich in complex organic chemistry. Anomalies in the methane cycle within Titan's atmosphere are identical to confirmed life signs from terrestrial microbes.

The selection criteria for astronauts has commonly and famously been based around the idea of 'the right stuff' – or in other words the candidates having the correct combination of attitude, lifestyle, physical prowess, political views and so on. There is also the strong connection to the military as a pool for candidates, despite the fact that scientific accomplishment is beginning to be seen as an additional virtue. Would the selection procedure for *drosophila* be in any way similar to the selection procedure for human astronauts? Would they be selected for their physical properties and attitude or according to more familiar and endearing traits. When would be the right time to send the first female *drosophila* into space?"

While we see the Fruitflies on Titan project as an interesting and provocative addition to the Lunar Analogue environment that would be at the Centre of Republic of the Moon, Andy Gracie's stark comments on selection are exactly what we will question in terms of thinking of who might live in a Moon colony.

We are humans, not fruit flies! Astronaut selection for Apollo, the Russian space programme during the Cold war are exactly what we regard when thinking of space travel as limited to those with the 'right stuff', exemplars of the top-down command-structures military paradigm that powers wars. By bringing artists into the equation, particularly those familiar with collaborative methods of working, can we redefine living governance and team behaviour in extreme circumstances in terms of collaboration, knowledge-sharing, consensual decision-making and multicultural approaches in rehearsing for, then living on the Moon? Or would it revert to Big Brother-style survival of the fittest? Republic of the Moon sets out an artist-driven manifesto that perhaps points out some alternatives for living and working in space.

(The Republic of the Moon project is a collaboration between The Arts Catalyst, London, FACT, Liverpool and other European partners taking place in 2011-2014)

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OPEN DESIGN PRACTICES + WEARABLES + 3ELECTROMODE

VALÉRIE LAMONTAGNE

This paper investigates open design strategies within DIY wearable practices and the collaborative initiatives of 3electromode and other design collectives in the field of fashion and technology. It looks at how technologies are facilitating access and small production lines in the changing creative and production practices of fashion and technology—from an industrialized vs. craft-based one—to a high-tech, hybrid, networked cottage industry.

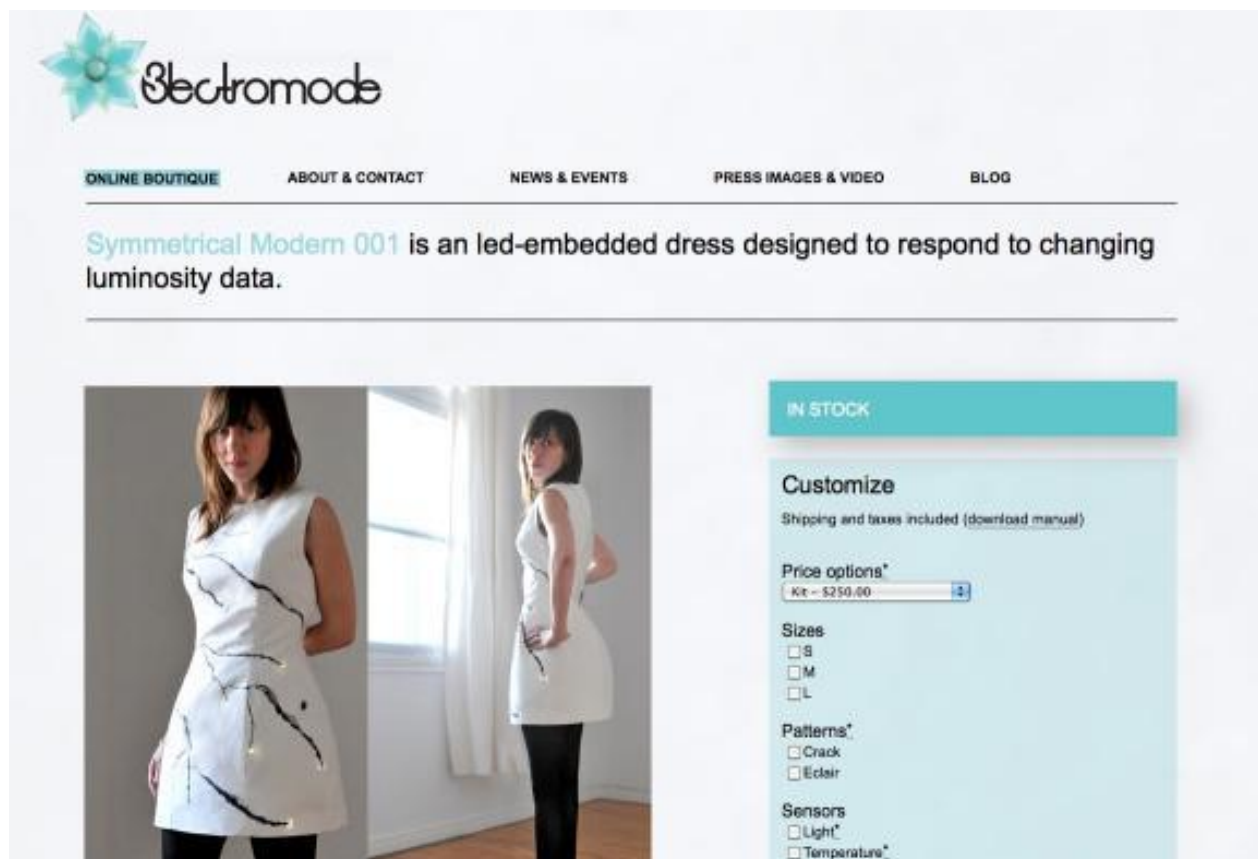


Fig 1. © 3electromode website



Fig 2. © 3lectromode Asymmetrical Modern 001 (detail)



Fig 3. © 3lectromode Symmetrical Modern 001 Éclair

What is Open Design?

OPEN DESIGN IS ABOUT MAKING.

Open design is about making—it is about innovation in methods, materials, practices and technologies which are experimented in a hands-on, experiential, trial and error fashion. It is a practice invested in giving people the means to make things they could either have not made on their own or previously (because of lack of knowledge or access to technologies and methods) or would not have made on their own or previously (because of lack of exposure to the potential of new technologies, designs, materials and methods). Open Design is about tangible—material—dreaming. It is also about democratization of fabrication methods, aiming to include makers and users with no minimum experience standards, save lack of ideas or persistence. Open Design is also about a willingness to get your hands dirty, ask questions, mess around with materials, and question and contribute to ideas already in the air or literally on the table. Open Design is not so much about success or failure, but more about the process, about the relationship between ideas, people, machines and materials and how they come together to create a “thing”.

OPEN DESIGN IS ABOUT ACCESS.

Open Design is about access—it is about putting the means, knowledge, techniques, technology and materials needed to make things easily accessible. Much of this access is done via internet culture promoting practices, tutorials, and information on where to find materials and services. Sites such as Instructables and Craft, featuring a wide range of technology and craft-based tutorials, are places to go to to find materials and methods. Other websites such as Open Hardware and Thingiverse share files for the emergent and growing practices of 3D printing and other forms of machine-tooled and 3-dimensional object making. While tangible meeting and working sites, Fabrication Laboratories (or FabLabs), such as ProtoSpace (Utrecht, Netherlands) and Open Design City (Berlin) as well as Hackspaces such as c-base (Berlin) have made a significant change in the availability of access to machines such as 3D printers, laser cutters, and contact with a community of technical and computational experts. Of course, festivals, fairs and events such as MakerFaire, SIGGRAPH, SXSW, Transmediale (Berlin), FutureEverything (Manchester) and ISEA provide great opportunities to share knowledge, skills, and meet the actors involved in the global shift of sharing design expertise.

OPEN DESIGN IS ABOUT COMMUNICATION.

Open Design is about communication—it is a practice heavily reliant on documentation—video, photo, illustrations etc.—and the vulgarization of technical language leading to the simplification or elimination of specialized jargon. It is important that design concepts and methods be easily understood, communicated, modified and shared across platforms and knowledge bases. Without the ability to communicate practices, Open Design would perish. Open Design is about community, hence it is about the accessibility of information, knowledge, practice, tips, and knowhow—which would be impossible without shared language. It is about creating interactive relationships between makers, designers, and technicians, which can be interpreted over a broad range of experience and interests. Think of Open Design as a communal soup, which is expanded, modified, corrected, and enhanced over time—but always accessible. As long as we can follow the tread / information / instructions we can all participate.

OPEN DESIGN IS ABOUT SOCIAL ADAPTATION.

Open Design is about social adaptation—it invites initiated and uninitiated users to reproduce, modify, improve, customize—and be inspired by others and their work. It is about co-creation, and ‘personal design nodes’ where the shape and making of design can be seamlessly personalized, and adapted to use, whimsy, or even unforeseen practical solutions. It is both about the personal and the collective in as much as it solicits input from individuals for their needs and desires while also keeping the practice and knowledge open-ended enough for collective contributions and specializations over time. Works such as Nervous System’s user-generated, nature inspired jewelry propose new and exciting design collaborations where the results unexpectedly unfold. Open Design stresses for adaptability on the material front (easily modified techniques and technologies) and the social front (easily personalized, accessed and interpreted designs) in order for it to remain conversant with future designers. Open Design is a future forward practice, which factors in social adaptation for processual design iterations.

OPEN DESIGN IS FREE!

Open Design is free—because making it free permits it to travel far and wide, gain exposure, be critiqued, improved through stylistic as well as technical corrections, additions and modifications, pushing the discipline forward. And if others give it away, so can you. It does not mean that you cannot make things, sell them, or get paid for what you do—but rather that key information, practices, and materials that contribute to the making are either distributed or rendered physically accessible for free in a belief that, sharing makes for better design, and better communities. An example of this economy of Open Design is Ronen Kadushin’s Hack Chair, wherein the designer made all of the chair’s DXF files available for download, copying, re-use, and interpretation. The only parameter implemented was that if a new iteration of the Hack Chair was marketed and sold, profits would be shared with the original designer. The Hack Chair and its concept has led to a series of exciting and unscripted design iterations, collaborations, and exhibitions for Ronen Kadushin. This ‘free’ practice is predicated on the Creative Commons structure, which also allows for a spectrum of copyright attributions and uses which can be adapted to different production and cultural artifact contexts.

What can Open Design do for wearables?

UNZIPPING WEARABLES

Open Design for wearables democratizes and ‘unzips’ the practice, making it more accessible from a variety of angles, needs, technologies and visions. Wearables is a wide ranging practice as it stands, combining engineering, fashion design, craft and technical production methods as well as artistic expressiveness and computational know-how. With such a variety of input points and expertise angles, Open Design serves wearables by making the divergent axis communicate with one another, share knowledge, skip over technical jargon and schematics and create a platform that is richly and widely interpretive for many users and many uses.

SITES OF OPEN DESIGN IN WEARABLES

Sites specializing in e-textiles such as *How To Get What You Want* run by Mika Satomi and Hannah Perner-Wilson are a wealth of information on techniques for creating soft circuit designs while publication such as *Fashioning Technology* by Syuzi Pakhchyan (which now runs as a wearables blog and networking site) give numerous concrete examples are ‘recipes’ to create your own D-I-Y electronic garment or object. The recent Open Softwear publication on which Melissa Coleman collaborated also expands on the technical practice of wearables by untangling information around its production. Finally, real meeting points such Otto von Busch’s Hacking Couture workshops and the E-Textile Workspace run by Piem Wirtz and Melissa Coleman at V2_ Institute for the Unstable Media (Rotterdam) give an interested or active public a forum to share information and get tips on practical issues, and conceptual developments in the field of wearables.

All of these sites, publications, and locations dedicated to wearables operate on limited or no funds, and are in principal free (or almost free) of access. Though perhaps not self identified as Open Design, they are certainly conceptually and practically oriented towards it. What is more, they seamlessly converge with and contribute to Open Design websites, spaces and practices previously mentioned, adding to the distributed network of knowledge and practices.

TRANSFORMATION OF WEARABLES VIA OPEN DESIGN

What we see with this increase in access to knowledge, spaces, technologies and practices is a professionalization of the wearables field. Previously craft or technical-only niche groups are becoming increasingly conversant with one another. Access to high-tech tools and experts are ‘industrializing’ the practice giving designers more options to professionalize their craft through custom circuits, 3D printing, laser cutting etc. The technical networks, both tangible and conceptual, help shape this hybridization of the wearables field by giving designers access to specialized knowledge and tools, resulting the expansion of their material repertoire and craft expressiveness. Fashion designers such as Pauline van Dongen have collaborated with 3D printing company Freedom of Creation to create 3D printed shoes, while Anouk Wipprecht has collaborated with wearable art labs such as V2_ to develop interactive garments. Meanwhile, Moon Berlin, a fashion label exploiting light in their designs, has combined the best of fashion with the best of technology by collaborating with the Fraunhofer IZM and incorporating their state-of-the-art stretchable circuits. All of these wearable designers are tapping into expertise and tools which are distributed in an increasingly open and free spirit.

The results of this open exchange is the emergence of an increasingly high-tech, hybrid, networked cottage industry in which fashion knowhow and electronics innovation are being merged in a professional yet highly democratic fashion culture and community. Though the overlaps come from at times divergent technical and artistic fields as well as economies, the push is, as noted in the Creative Common’s recent anthology of interviews ‘The Power of Open,’ a solid argument for “sharing becoming a default standard”. This is a revolutionary moment for the making of wearables and 3D objects, similar to that which occurred in the 2D world of desktop publishing in 1985, which we should embrace, share, contribute to and protect via Open Design philosophies and practices.

Open Design + 3electromode

DEMOCRATIZED, AESTHETICIZED, AND PERFORMATIVE

I want to take this opportunity to speak about my own involvement in Open Design, via the 3electromode platform. 3electromode holds the vision of innovating in the field of wearables by combining technology with customizable prêt-a-porter fashion. We aim to inspire a future where wearables are democratized, aestheticized, and performative. We are a small design group interested in developing accessible wearables which combine D-I-Y technology with current fashion research. We are fascinated with the potential for technology to create new modalities of interaction between the body and its environment, and are interested in the performative potential of technology.

OPEN KITS + USER-INPUT

Key to 3electromode's design ethos is a to create a library of open sourced fashion designs which can be easily assembled as kits by anyone with an interest in wearables, electronics or fashion. The kits come complete with the printed garment, necessary electronics and instructions, taking the guesswork out of electronics assembly while permitting the user to create a customized and fashionable design.

Designs are printed on textile printers on which also include the layout of electronic schematics and sewing directions. The methods for assembling the electronic components of the wearable are integrated into the design and can be visually followed much like a painting by numbers, without interpretation or recourse to manuals. Each piece is uniquely designed, and comes with customizable options for different print patterns, colours, models, and sizes - giving the user-end designer agency in creating his or her own iteration. Computational variations are also included to modify LilyPad Arduino program. So far, the designs with 3electromode have focused on integration of LEDs with various sensors, utilizing the LilyPad Arduino platform for electronic components and programming.

3electromode's kits are the perfect entry point into wearable technology because of their graphic visualization of electronics assembly methods, while also creating a uniquely stylish and fashionable garments. In the process of testing out this Open Design platform, we at 3electromode have been interested in integrating feedback from the user-end designers and welcoming collaborations on the sharing of techniques, designs and applications. Ultimately, while keeping a stylistic curatorial vision true to 3electromode, we are interested in seeing how people might hack and interpret our work in an Open Design fashion.

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TELE_TRUST FOR NETWORKING BODIES

Karen Lancel

Lancel & Maat explore our perception of augmented 'reciprocity', 'presence' and 'trust'. In an iterative research process they match theoretical insights with experiential data in a series of artworks, designed as 'Social Labs' in smart city public spaces. Experimenting with tangible interfaces and participatory systems, new insights, innovative technologies and the human body meet to inspire (yet) unimaginable types of engagement.

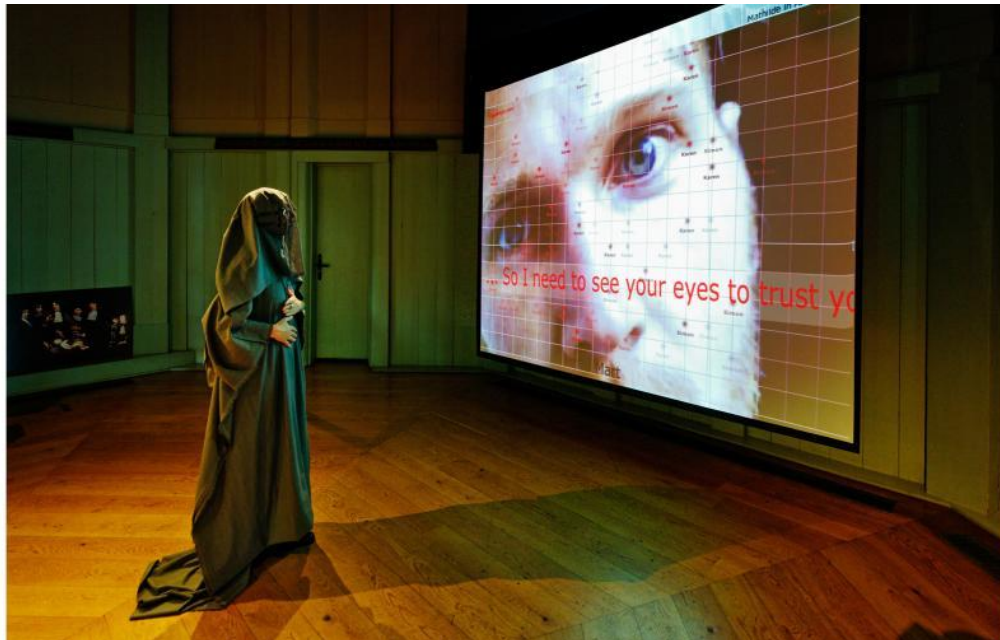


Fig 1. Tele_Trust, 2010, Lancel & Maat, photo by Pieter Kers. Location: Waag Society for Old and New Media Amsterdam. The 'DataVeil' is a smart textile wearable tangible interface connected to a free smartphone app; for an intimate networked body experience. Audience members wear the DataVeil.



Fig 2. Saving Face, 2011, Lancel & Maat, Photo by Maat/Lancel. Performance Installation 'Saving Face' is a smartphone app connected to networked urban screens. The smartphone app functions as a 'touching-body-scan'; with which one can create together a non-controllable composed 'networked identity' through the act of touching and caressing one's intimate face. Development with the Waag Society for Old and New Media Amsterdam and Dutch Media Fund.



Fig 3. Tele_Trust, 2010/2011, Lancel & Maat. In Festival 'ElectroSmog', photo at BNMI Canada. Six Tele_Trust DataVeils are networked through an online database and smartphones in three different public spaces and time zones: Netherlands, Canada; New Zealand.

'I am part of the networks and the networks are part of me...I link, therefore I am. '[1]

How do we trust each other as networking bodies?

In our contemporary networked society, interaction increasingly takes place through wireless, social networked media. The possibilities of tele-presence have made place and distance irrelevant for the experience of social proximity and allow 'networking bodies' to be present at several locations, temporalities and social settings at the same time. At the same time the public space turns into a 'smart environment' that increasingly interacts with the electronically and digitally enhanced body. These developments cause profound changes in the role of the body and physical presence since mediated presence leaves little or no room for touch, face to face encounters, and body language that are core components for the building of trust and reciprocity, which are in turn the foundations of social structures.

Tele_Trust is a research into how in mediated and tele-present society bodily based experiences of presence, reciprocity, and trust can be generated, mediated and maintained. It is a critical and sensitive exploration in how we can intensify networked affective experiences in relation to the mediated body. It looks for new forms of interaction, participatory and multi actor systems and interfaces, in which the conditions for 'reciprocity' and 'trust' can be recognized and acknowledged or differently perceived. In Tele_Trust new insights, innovative technologies, and the human body meet to initiate and inspire (yet) unimaginable types of intersubjective engagement.

Tele_Trust is an inter-disciplinary research. It is developed, tested, shown and published in collaboration with universities and (art) academies; tech-labs and media institutes; in museums, festivals and conferences. It is an iterative research process in which theoretical insights are matched with experiential research data:

A. Theoretical context. The theoretical context includes media-theories emphasizing the central position for affective and receptive sensory processes in the body experiencing the world - and perceiving the other. Among others it relates to texts of Donna Haraway, Caroline Nevejan, William J. Mitchell, Michel Foucault, Paul Virilio, Mark B.N. Hansen.

B. Art works - 'Social Labs'. The experiential research takes place in art works designed as technically smart 'Social Labs' in dynamic public spaces. For these 'Social labs' Lancel and Maat deconstruct existing social interaction models and subsequently reconstruct them into new models for semi-compatible multi-actor systems. They build on these systems because through the gap of incompatibility they experience a drive for creative, audience engaged experiment. The social labs develop as follows:

1. Firstly parameters for designing networking body presence and body proximity are distilled from theory and translated into model-drawing and 3-d maquettes.
2. This leads to the development of a series of 'Social labs', containing networked wearable devices and bio-interfaces. Examples of these 'Social Labs' are 'Tele_Trust', 'StalkShow' and 'Saving Face'; visible on <http://www.lancelmaat.nl>.
3. The 'Social Labs' provide the context for obtaining research data; through the networked devices and interfaces we test parameters for networked body presence and trust. With participants we discuss their experiences, perception, needs; and their gained physical, spatial and social knowledge. The 'Social Labs' take place in various social geographical cultures.

4. 'Social labs' participants contributions are added to a data-base and website, creating an engaging, intercultural agora on the notion of networked trust, reciprocity and presence systems.

Case Study: Social Lab 'Tele_Trust'

How do we trust as networking bodies? Do you need to see my eyes to trust me or do we need to touch?

The social lab Tele_Trust is a performance installation. It creates an engaging agora researching new parameters for online trust. In Tele_Trust we are faced with a paradox: while we increasingly demand transparency in our changing social eco-system, we cover our bodies with personal communication technology. Tele_Trust it invites the audience in a semi-compatible social system for an innovative, reflective embodied encounter. In a visual poetic way, the artists research contemporary emotional and social tension in smart cities - between visibility, presence, privacy and trust.

How does it work?

Tele Trust networked performance-installation takes place in dynamic city semi-public spaces, like train station, museum, festival. Here the audience meets in an interactive DataVeil. This DataVeil is a tangible body interface for 'scanning online trust':

DataVeil.

The DataVeil is a full body covering garment, Gender neutral, and One size fits all. Its design is inspired by eastern and western traditions, like a monks' habit, a burqa, Darth Vader, and a 'trustworthy' chalk stripe business suit.

When wearing the DataVeil it functions as a second skin. Flexible, invisible touch sensors woven into the smart fabric of the veil, transform your body into an intuitive, tangible interface. It is a membrane for scanning an intimate, networking body experience:

Smartphone connected to a DataVeil.

Can I touch you now? By touching your body in the DataVeil, you meet strangers online through their smartphones. Inside the DataVeil you may be unidentifiable but before 'disappearing' your portrait is added to an online database. By gently caressing their screens, anonymous smartphone users worldwide can unveil your face online. In an intimate body experience and real time audio, you share emotions and statements of trust, about the questions: Am I here with you? Who is watching who? *Who is controlling who? In what identity and in whose body?*

Database.

In an ongoing process, user generated content is continuously added to the Tele_Trust database. With the DataVeil the artists collect knowledge about 'privacy' and 'trust' in different social-geographical cultures. Stories from different cities weave together into an exchanging narrative -

Everyone can wear a DataVeil.

Tele_Trust interactive DataVeil and free smartphone app are developed with V2_Lab for unstable media Rotterdam Netherlands; Banff New Media Institute Canada, Technical University of Delft Netherlands.

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1. William J. Mitchell, *ME++: The Cyborg Self and the Networked City* (Cambridge, MA: The MIT Press, 2003).

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Tele_Trust performance-installations 2009-2011:

ISEA2011 Istanbul; V2 Lab for UnstableMedia Rotterdam; Banff New Media Institute Canada; Stedelijk Museum Amsterdam; Festival a/d Werf & PSI Utrecht; De Balie Amsterdam; ADA-network Dunedin New-Zealand; Waag Society for Old&New Media Amsterdam; Technical University of Delft; Lumineus Amersfoort; Tschumi-Pavillion Groningen; Exposorium Vrije Universiteit Amsterdam; Gogbot Enschede; ARTEZ Studium Generale Enschede.

Tele-Trust reserach on conferences:

Leonardo@ARS-ELECTRONICA Linz; Shanghai World-Expo 2010 - Mobile City, Virtueel Platform, DCC; Sonic-Acts XIII Amsterdam; PSI and University of Utrecht 'Camillo 2.0'; University of Amsterdam and NIMK Amsterdam 'The Bodily Turn'; University Sabanci Istanbul ISEA2011; University of Utrecht 'Vrede of Utrecht - Utrecht Interactive'.

BUILDING ACCESSIBILITY STORIES: ENABLING MULTI-SENSORY EXPERIENCES WITHIN THE OLPC PROGRAM IN URUGUAY

Tomas Lorenzo & Gustavo Armagno

This paper shows *Enabling Stories*, a multimodal, interactive storytelling application, designed for children with physical disabilities, as well as children with normative development, that runs on *One Laptop Per child's* computers.

Enabling Stories is a tool for stimulating the development of specific cognitive functions and skills, as well as promoting digital inclusion, and improving social, emotional and motivational aspects on its users.



A girl playing with Enabling Stories, a multimodal interactive storytelling application.

Introduction

The *One Laptop Per Child* (OLPC) program aims to provide each child in developing regions with a connected laptop to address the digital divide and to allow them “to become connected to each other, to the world and to a brighter future.” [1][2]

Uruguay, through its governmental project –*Plan Ceibal*– was the first country to achieve the ‘full deployment’ status, after successfully delivering a laptop (named XO) to every public schooled child between 6 and 12 years old. [3] The acronym ‘Ceibal’ stands for Conectividad Educativa de Informática Básica para el Aprendizaje en Línea (Basic Computing Educative Connectivity for Online Learning; more information about Plan Ceibal is available at <http://www.ceibal.org.uy>). *Plan Ceibal* is now targeting secondary education (youngsters from 12 to 18 years old) as well.

Although *Plan Ceibal* successfully enabled internet access to all its users, by claiming that all the child population of Uruguay is now connected it ignores the fact that access to technology transcends the mere physical immediacy. There are users with disabilities that difficult or prevent them from fully take advantage of the *Plan*’s potentials and opportunities. An ethnographic study conducted in the primary school *Dr. Ricardo Caritat*– the only public school in Uruguay for children with motor impairments – observed that a combination of factors, including the XO ergonomics, the software interaction design, the lack of suitable software accessibility helpers, and the limited availability of accessibility peripherals, undermine the XO’s accessibility. [4]

In spite of the fact that the *Plan Ceibal* program explicitly states that the children are the true owners of the computers, the accessibility problems discourage physically impaired children from appropriating this technology, and therefore, difficult their access to the knowledge society.

Accessing Ceibal

Thanks to OLPC laptops coming with an integrated webcam, a reasonably fast processor and a speaker, it is possible to develop multimodal interfaces to improve accessibility. [4] Potentially, multimodal interfaces accommodate a broader range of users than traditional graphical user interfaces (GUIs) or unimodal interfaces, allowing for the inclusion of users of different ages, skill levels, cognitive styles, sensory impairments, and other temporary or permanent disabilities. [5]

With the aim to address these problems, and to foster an authentic appropriation of this technology by children with motor impairments, an innovative interaction schema to access the XO was proposed. [4] The new schema avoids the “keyboard, mouse, screen” paradigm by allowing for the execution of actions that are triggered when the user shows an image to or occludes it from the XO’s camera, and by also providing multimodal sensory feedback.

This images can be of any kind (our implementation utilizes printed images created with a standard printer), as long as they meet certain requirements of resolution, contrast between foreground and background, and uniqueness to be easily identifiable and differentiable from one another. Images that can be considered for the interaction include pictographs (such as representations of animals, people, or means of transportation), ideograms (resembling concepts, actions, or instructions), words, letters, numbers, two-dimensional barcodes, among other symbols. In addition, the images can be of any size or

shape provided they fit in the field of view; can be printed in paper, cardboard, stickers, or other printing media; can vary in color; and can be glued or attached to different objects.

Since the images can be arranged in different supports, they can afford different user actions, like touching, rotating, or holding. This versatility gives designers and application developers the freedom to create different games or applications based on diverse interaction strategies.

From an educational point of view, this approach can potentially be employed in developing cognitive, affective, and psychomotor educational aspects.

Multimodal activities

Three different types of applications (in XO jargon, *activities*) were created to explore different educational strategies that could help develop children's motor and cognitive skills, improve their self-esteem, augment their autonomy and foster their relationship with the environment and with other persons.

The activities are as follows:

Activities focused on developing specific cognitive functions and skills involve presenting users with a problem and waiting for the right answer. The solution could demand sorting images (e.g., distributed on several printed cards with a rigid base), or picking, from a set of printed images, the one that contains the correct answer. For example, to develop children spatial relationships, the layout could consist of a set of images illustrating the relationships up-down, in-out, or open-closed. The user's goal is to identify the abstract relationships and matching them with the corresponding cards in the deck.

Activities focused on promoting digital inclusion and enhancing autonomy allow for the user to trigger predefined actions in the XO –e.g. opening an activity, unrolling a menu, controlling a game character, moving the mouse cursor, or selecting a tool– by choosing from a number of options printed on a proper media, such as a sheet of paper. Three activities are being developed: a *faux keyboard* that associates drawings to some keyboard keys (e.g. the arrow and enter keys), *the bookmark* where the user can navigate to pre-defined web sites by touching its corresponding drawing, and *the launcher*, a menu from where the user can run XO activities.

Activities focused on encouraging social, emotional and motivational aspects incorporate musical, recreational and narrative elements. One of the prototypes under development is an interactive storytelling application, which will be discussed in the next section.

The proposed activities share some common characteristics:

- Beyond the cognitive challenge associated to the process of triggering a specific action from the computer, all the activities demand children to reinforce their motor skills, either by seeking a printed card from a deck, pointing at (or occluding) an image, or raising an image to show it to the camera.
- The simplicity and versatility of the input device –e.g. with a piece of paper it is possible to create a keyboard– allow the teachers to create their own exercises, encouraging them to effectively use the XO as an educational tool for their classes.

- Regardless of the fact that the framework was designed for children with motor impairments, nothing prevents it from being used by children without those impairments.

By the massive use of these prototypes we expect to obtain data about their usability within this target population. Our observation indicates that the activities are perceived as highly attractive by its users, showing that it is possible to design new ones with a high motivational component.

Interactive Storytelling

Storytelling -or the art of telling stories- is a fundamental characteristic of mankind. In the words of Hamilton and Weiss, “storytelling is the oldest form of education”, since “people around the world have always told tales as a way of passing down their cultural beliefs, traditions, and history to future generations.” [6] The process of listening, creating, and telling stories is particularly important in the development of children: stories can help them to understand their world and to share it with others. [7] In early development stages, storytelling reinforces communication, recognition, and recall skills, favors social relationships between peers and adults, and provides meaning to their living experiences. In later stages, storytelling improve linguistic and literacy skills, and promote interpretation, analysis, and synthesis abilities. [8]

In addition, storytelling has been used as a method to work with children’s conflicts and concerns, helping them to “objectify and, at times, to personify the problems that they experience as oppressive.” [9] For children with disabilities, different storytelling approaches have been used to support the development of cognitive functions and skills. [8]

In recent years, interactive storytelling has become increasingly popular in the field of human-computer interaction. In 2010, the full-day workshop of the ACM’s (Association for Computing Machinery) Ninth International Conference on Interaction Design and Children (IDC 2010), titled “Interactive Storytelling for Children”, aimed to bring together researchers from different fields that share a common interest in the subject. [8]

Compared to traditional storytelling, interactive storytelling applications allow the audience to actively participate in the drama, by altering -during the course of the story- the action, character, dialogue, and narrative performance. As a consequence, interactive storytelling can multiply the narrative possibilities, upgrading the role of the audience from listeners to participants of the story. As in traditional storytelling, there exists the role of a storyteller, either human or synthetic, whose challenge is to make sure that the story maintains a certain level of quality.

This quality can be measured in terms of consistency, *enjoyability*, *memorability*, among other parameters. When designing and developing a digital interactive storyteller, these requirements can be difficult to accomplish since it is difficult to find a proper tradeoff between the story narrative and user interaction. [10]

Research in this field includes specific applications, such as the construction of furry storytelling robots to motivate children with developmental disabilities, augmented reality displays to communicate scien-

tific information in museums, and tangible interfaces for storytelling using physical objects (see, for example, [11]); studies about the educational value of authoring interactive storytelling in formal education, or how children can develop narrative skills by programming interactive storytelling games; and studies about using interactive storytelling for helping children with special needs. Garzotto, *et al*, provided a survey of papers related to interactive storytelling. [8]

ENABLING STORIES

Enabling Stories is a multimodal interaction-based interactive storytelling application, designed for children with motor or cognitive disabilities, as well as for children with normative development, that runs on OLPC's XO computers.

The application is not only an interactive storytelling game but also a tool for the stimulation of the development of specific cognitive functions and skills, as well as for the promotion of digital inclusion, and the improvement of social, emotional and motivational aspects on its users.

Enabling Stories performs the role of the storyteller. It is responsible for directing the story plot by modeling key aspects of the narrative, such as characters, places, possible interactions between characters, etc., and to present the story to the user.

Interacting with the storyteller –by setting scenes up or by answering to specific questions– the user is allowed to modify the story, building new ones on real time, and therefore actively participating in the drama. For example, the storyteller would describe a scene by using spoken text, images, music, video, etc. and then prompt the child for information.

The application supports an input modality based on the interaction schema mentioned before, as well as traditional input gestures, such as selecting a displayed option with the mouse. When an event requiring user interaction occurs, the storyteller waits for the user input. A rather trivial example would be: “the girl is taking a hike in the forest, who does she meet?”, the child, then would take one of the printed images (let's say, one with the drawing of a dog), and puts it in the space seen by the computer's camera. The storyteller then continues with the narration using the user input. Depending on the type of event, the storyteller could time out the scene and then continue with the following one.

Conclusions and future work

Uruguay's OLPC program, *Plan Ceibal*, aims to provide a connected computer to every child and teenager of the country. Different studies show that the provided computers are not accessible for children with motor or cognitive impairments. To foster the appropriation of these computers, we proposed different types of applications that explore different educational strategies, based on an interaction schema that avoids the traditional “keyboard, mouse, screen” paradigm.

One of these proposals, named *Enabling Stories*, is an interactive storytelling application supported by a multimodal interface. *Enabling Stories* is aimed to develop children's motor and mental skills, enhance their self-esteem, improve their autonomy, and favor social relationship between peers and adults.

Beyond the application characteristics that make it attractive, we speculate that children with motor impairments can benefit from the physical and cognitive challenge involved in the action of showing the printed images to the computer.

FUTURE WORK

A new stage of the work has commenced in June 2011, under the project “*NEXO: New Interaction Modalities for the XO*”. The project involves the study of the incidence of different types of applications, including *Enabling Stories*, in children development.

The study will be conducted by UDELAR graduate and undergraduate students of cognitive psychology and computer science, during a six-month period.

This stage includes the design and development of different types of applications, focused on developing cognitive functions and skills, enhancing children’s social domains, and improving emotional and motivational aspects.

Within this study we expect to evaluate if the proposed applications effectively represents a positive impact on different developmental domains (physical, cognitive, social, or emotional domains).

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THE LEGACY OF EXPERIMENTS IN ART AND TECHNOLOGY (E.A.T.): AN ENVIRONMENTAL AESTHETICS

Christophe Leclercq

E.A.T.'s legacy rests on the early development of an environmental aesthetics. This aesthetics, however, does not focus on the idea of nature (as the prevalent notion of environment has it) but rather on the built and, particularly, the technological environment. This environmental aesthetics problematizes the nature/culture dichotomy in a manner that is of particular relevance to contexts that are increasingly infiltrated by technology.

Experiments in Art and Technology (E.A.T.) is a well-known example of interdisciplinarity at the intersection of art, science and technology. It was founded by Billy Klüver, Fred Waldhauer, Robert Whitman and Robert Rauschenberg in order to facilitate collaboration between artist, engineer and industry. As Brandon W. Joseph wrote in *Artforum* in 2004: "Klüver bequeathed to us a set of questions and contradictions involving art, industry, technology, and corporate sponsorship that--amid the glitz of new technologies and the renewal of foreign wars--deserves a place at the forefront of our historical consciousness." [1] Indeed, E.A.T. sought to recognize the role of technology in society and especially the new responsibility of artists and engineers in complex industrial societies.

The organization has been examined in part by curators, art historians and researchers who focus mainly on the *9 Evenings: Theatre and Engineering festival* (1966) and, to a lesser degree, on the Pepsi-Cola Pavilion at "Expo '70", at the Osaka World Fair. The Pavilion can be seen, as Fred Waldhauer says, as "a culmination of the experiment during 9 Evenings." E.A.T. and its projects are often interpreted either in terms of their success, by defenders of new media art, or their failure, by contemporary art critics in the main.

From a different perspective, however, the Pavilion can be considered a turning point, and some experimental works and projects resulting from collaborations initiated by E.A.T. meaningful attempts to renew fundamental aesthetic questions. Closer examination of the statements associated with E.A.T. projects pre- or postdating the Pavilion, or even projects that remained unrealized (which are numerous and merit attention), reveals the omnipresence of the concept of "environment." Beyond the development of devices as tools or instruments, that would be available to other artists, this notion, investigated in *Oracle* and in the Pavilion, can be seen as a key concept in seeking to understand the switch by E.A.T. from an art to a non-art context. E.A.T.'s legacy can be said then to rest on the early development of an environmental aesthetics, which does not focus on the idea of nature (as the prevalent notion of "environment" has it [2]) but rather on the built and, particularly, the technological environment.

Following Allan Kaprow's *Assemblage, Environment and Happenings* or the exhibition *Environments, Situations, Spaces*, it is tempting to consider an environment as a new art form. The Oxford English Dictionary defines an environment in art as "a large structure designed to be experienced and enjoyed as a work of art with all (or most) of one's senses while surrounded by it, rather than from outside." The definition is precisely illustrated by a quote by Robert Whitman from *The New Yorker* on the Pepsi Pavilion.

[3] But the environment (“that which environs”) is a much more difficult notion, according to Frank Popper or Peter Sloterdijk. Contrary to the artistic concept of landscape – which implies the idea of a frame – the concept of environment seems to be used in art to question our understanding of our “surroundings”, and how it affects us and can be affected by us. As a result, certain of Tinguely, Rauschenberg and Cage's works can be seen as different attempts to focus on the perception of our shifting urban environment, in this case New York City.

Rauschenberg's *Oracle* is an essential work that deals primarily with this issue. Deeply affected by Jean Tinguely's self-destructive sculpture *Homage to New York* (1960), Rauschenberg subsequently tried to realize, with the help of Klüver, an “interactive environment where temperature, sound, smell, lights, etc., could be affected by the person who moved through it.” [4] This resulted in *Oracle*. First exhibited at Leo Castelli Gallery in 1965, this work consists of a console with an aluminium staircase housing AM radios and electronic control equipment, to which Rauschenberg added four other sculptural elements described by him as “gifts from the streets”: a round industrial duct in the form of a funnel; a window frame with duct; a car door mounted on a rolling typewriter table, with a large piece of crumpled metal behind it, and a basin combined with an air-conditioning duct through which water circulates. All of these assemblages were on wheels so that the artist could move them freely. As it is no longer possible to interact with the work, one has to revert to earlier descriptions of the experience, in the 1960s, to understand how this work problematises the perception of environment. Klüver specified that, in this installation at the Leo Castelli Gallery, “the viewer could freely walk among them and operate the controls on the staircase.” Visitors were able to move control the volume and the speed of the dial scan. “In full operation,” Klüver wrote, “*Oracle* becomes an animated cityscape.” As an active participant in the work, the visitor took part in this urban environment and was responsible for what he did. *Oracle* was also described by the art critic William Berkson as “a funhouse, a torture-chamber or a laboratory for testing perception.” This latter metaphor corresponds exactly to Andrew Forge's description:

To stand by the console is to be aware of a continual coming and going of sound, predominantly spatial. [...] The very sensation of hearing, it seems, has become a kind of looking. One doesn't know which way to point one's eyes, so strikingly does the sound reframe the appearance of the machines, giving them a kind of speed -despite the fact that they just stand there dinning- or if not speed, a kind of flashing nowhereness like parked cars seen peripherally from a speeding scooter. And as soon as you move away from the console, among the pieces, you find your movements, your familiar physical measuring of close distances becoming a matter of urgency to be set alongside this new space that you are hearing inside your head. [5]

Forge's description of his experience focused on the plasticity of sound and the mutual interdependence between seeing and hearing which Rauschenberg would explore further during the *9 Evenings* with his performance *Open Score*. This festival took place at the 66th Regiment Armory in New York, in 1966, as a result of several months of collaboration between artists and engineers from Bell Laboratories. According to Clarisse Bardiot, the Theater Electronic Environmental Module, known as the TEEM, was the “major achievement of *9 Evenings* and its most important message for the art experimentation that would follow.” [6] Designed to fulfil the function of an on-stage environmental electronic system, it enabled the performers to reconfigure the space in which the action took place by using a remote-control system for the lights, speakers, microphones, cameras, film, motors, etc. John Cage's statement for his performance *Variations VII* was to “use sounds available at the time of the performance” picked up indifferently inside or outside of the Armory. 10 telephone lines were installed in the Armory, open in different places in New York city including a restaurant, an electric power station, the New York Times

press room and Merce Cunningham's studio. In addition, there were contact microphones on the performing platform itself and on domestic appliances (a fan, a juicer, etc); there were also 20 radio bands, 2 television bands, and 2 Geiger counters. 30 photocells and lights set up around the performance area activated the different sound sources as the performers moved around. Classical musical composition and traditional instruments are here replaced by a protocol which welcomes, like *Oracle*, selected sounds "in the air" and challenges profoundly the perception of inner and outer exhibition space frontiers as well as the perception of distance.

McLuhan's theories – that John Cage always praised – were controversially discussed during the *9 Evenings*. The recognition of technology by Klüver and Rauschenberg as a "natural environment" resembled in a certain way the naturalization of technology as emphasized by the media theorist and essayist. The variable environments built in the Armory can also be interpreted as a means to employ "multiple models for exploration", McLuhan's so-called "method of our time", to make people aware of technology's effects on perception. Indeed, McLuhan described the role of the artist, with regard to the technological environment, as follows :

Environments are not passive wrappings, but are, rather, active processes which are invisible. The ground rules, pervasive structure, and over-all patterns of environments elude easy perception. Anti-environments, or counter-situations made by artists, provide means of direct attention and enable us to see and understand more clearly. [7]

Marcelyn Gow rightly established that Klüver's concept of the environment differs from McLuhan's understanding of a pervasive and ineluctable process. According to Gow, Klüver thought it "in relation to human interaction with technology or what could be called programming, in order to produce specific effects", i.e., where "feedback mechanisms" enable the effects of technology to be actively reshaped. [8] We can add that the core opposition, aesthetically, is based on the quantity *and* the quality of the feedback(s), that is to say between a conception of art as anti-environment (i.e as a reactive art form), and art as open-ended "experience, environment, process" (Barbara Rose), illustrated by the PepsiCola Pavilion for Osaka '70.

The Pavilion was a unique opportunity to work with industrial support, in the manner expressed in the E.A.T manifesto. While not deeply involved in the project, Rauschenberg suggested that artists working on the project "shift their approach to include elements that appealed to all the senses rather than just the visual, that is, elements that would create what people would feel as an 'invisible' environment." [9] This "invisible environment" was quite different from McLuhan's determinist understanding of such an environment, since the visitors would be encouraged to participate and then to "create their own experience" in what they called a "living responsible environment." Despite the relationship with Pepsi breaking down, the design and development of artificial fog and of an indoor programmable environment, responding respectively to local weather conditions and to visitors, can be considered meaningful artistic research. Outside the pavilion, Fujiko Nakaya's designed a *Fog Sculpture* in collaboration with the physicist Thomas Mee. 2,250 special fog nozzles were developed to create an artificial fog made of pure water at the request of the artist. Pumps were programmed to respond to different weather conditions: an automatic control system for programming was designed with real-time feedback of local meteorological data; namely, wind direction, velocity, and wet/dry bulb temperatures transmitted from the sensors at 6-minute intervals. The artist described her work as a "negative sculpture" because atmospheric conditions sculpted the fog in a concrete sense. She thus abandoned so-called "artistic control" in the shaping of this hybrid nature-culture artefact. Here again, however, she defined a protocol. Inside the Pavilion, a hemispherical mirror made of aluminised Mylar produced striking optical effects. One of

these was an effect known in physics as 'real image', consisting of an upside down or inverted image that exists suspended in the 'real' space inside the dome, rather than in the 'virtual' image created by an ordinary mirror. (i.e. images produced in ordinary mirrors exist in a 'virtual' space behind the mirror itself). Above all, this interior space, consisting of the mirror plus lighting and sound systems, was also designed as an "instrument" to be used "by individuals from different professions who [would] come to the Pavilion to implement their program ideas, and through this participation be able to adjust, expand and extend their ideas in response to the situation and opportunities they [would] find there." [10]

The Pavilion is a turning point not only because E.A.T. assumed an environmental approach to its activity but also because the team moved to a non-art context; in large part they weren't even sure what they were doing was art (they came to recognize it as such by the end of the project). The move to a non-art context – which had already been achieved by 1969 – may disturb the world of art but it makes sense from an environmental aesthetics approach. Thinking indeed that "the main influence of art and technology together will come in the area of the environment," the aim of E.A.T. was redefined in 1969 by Klüver, to "encourage the artist-engineer collaboration to fulfil its potential as a revolutionary force in shaping the hardware and software of our technological environment." [11] It is not a utopian definition since the nozzles developed for the Pavilion's Fog are currently used by Mee Industries Inc. in agriculture and industry, proving that successful transfer of an innovative technology, developed in collaboration with an artist, to industry is possible.

The word 'art', however, tended to be neglected in 'non-art' projects. Nevertheless, one can still recognize Klüver and Rauschenberg's aesthetic statements in an unfunded proposal for ten exhibitions. E.A.T. proposed a series of exhibitions for which the overall theme would be "Technology for the Individual: Recognition and Choices." [12] Indeed, the subjects chosen represent "areas of technological change where the unresolved issues will affect the direction of technological development in advanced as well as developing societies." The aim of these exhibitions was "to promote a recognition of the options presented by the new technology for the individual." The exhibitions were planned for October 1969, with the opening of Automation House in New York City, established by Theodore Kheel for "people to adjust in a rapidly changing world of automation and helping the individual to have a sense of participation in the society in which she or he lives." These exhibitions would have been designed by contemporary artists in collaboration with experts in the appropriate fields. The working titles for the ten exhibitions speak for themselves: "Variations of the Body: Genetics" by Allen Ginsberg; "Variations of the Body: Renovation, Transformation and Extension" by Steve Paxton; "Interactive Technology for the Three-year-old: Environments Designed by Teenagers" by Olga Klüver and Robert Rauschenberg; "Woman: Her Technological Environment" by Jean Dupuy; "Sports Equipment: Individual and Nature" by Claes Oldenburg; "Secrecy, Privacy and Snaring: Effect of the new communication and information technology" by William Burroughs; "Automation: Involvement or Alienation?" by Jean Tinguely; "Technology and the Environment: an Interactive, Computer-Simulated Ecosystem" by John Cage; "Atomic Energy: the Cloud and the Clear Sky" by Öyvind Fahlstrom; and "Shaping the Environment: Participation by the Individual" by Robert Whitman. This list comprehensively reveals the different preoccupations of the artists by this time, the extent to which they were concerned by the shifting environment they lived in and their desire to analyse the mix of technology, human and nature subsumed within this concept. Rauschenberg and Whitman's propositions in particular suggest an insistence on personal involvement as opposed to a more analytic approach.

Projects Outside Art (1969-1972) notably illustrated how E.A.T. paid attention to the specificity of a given environment, in contrast to McLuhan's position. Presented as "an exhibition of realizable projects in the environment", interdisciplinary teams were asked to propose a project dealing with education,

health, housing, concern for the natural environment, climate control, transportation, energy, etc., using the most innovative technology. Participants were asked “to recognize, in particular, the scale adequate for the problem undertaken, social and ecological effects, organizational methods necessary for realizing the projects” and for their project to “apply to specific geographical environments.” In *Children and Communication*, two groups of children from remote parts of the city of New York (considered as a rich and a poor district) were placed in two connected environments built by Robert Whitman. They were invited to experiment with available communication technology through the use of telex, fax, etc., a situation that Hans Ulrich Obrist compared to “a sketch for connected schools ages before the emergence of the Internet.” Another selected project, *City Agriculture*, aimed at creating closed-environment systems that would make it feasible to undertake city agriculture on a large scale. This also sounds extremely contemporary. Crossing different cultures or sociological contexts – city/countryside, rich/poor – was considered as a means of discovering solutions to contemporary problems while developing creativity.

Part of the multi-dimensional scaling projects or studies realized in collaboration with psychologists at Bell Laboratories, A Scaling Project Facing the Nation precisely dealt with the perception of social problems. The project aimed to correlate 22 economic, technological and social problems (i.e. unemployment, inadequate healthcare, pollution of the environment, racism, over-population, war, misuses of technology, etc.) with technical and scientific resources applicable to these areas. Individuals were given questionnaires and were asked to evaluate the relation between these problems and different contexts. The data was then processed by statistical analysis algorithms – the INDSCAL program developed by Douglas Carroll and Myron Wish at Bell Telephone Laboratories – and “the results were such that the axes in a three-dimensional space could be interpreted as local political--national political; technological--non technological; and moral individual--large scale organizational.” The subjects and the techniques involved (information visualization) are at the forefront of our contemporary preoccupations.

This move “outside art” makes sense as an attempt to escape the reification of art by the cultural industries and by the art world itself and to promote, as Klüver has it, variety and choice against repetition and uniformity. Nevertheless this move was misleadingly interpreted as a departure from aesthetics. However, the importance of aesthetic decisions and aesthetic conflicts in collaborative situations had already been noted and an aesthetics symposium was scheduled as part of the Projects Outside Art in 1970 to analyse these problems as well as to question the relevance of interaction between artists and engineers and of artists participating in non-art projects.

Through the concept of environment, the works and projects described stress the notion of artist or engineer control in art, technology and sophisticated industrial societies, and subsequently the role the artist can play therein. There was a belief in the possibility of improving the world quite different from postmodern cynicism. This belief placed the emphasis on the artists themselves – and in a larger context, on individual responsibility in a high-industrial context. E.A.T.'s environmental aesthetics does not consist of an aesthetic appreciation of natural, human environments or indistinct everyday activities. Rather, it is a question of examining art through the concept of environment and the environment through the practice of art; recognising a specific artistic expertise for environmental issues in art or non-art projects which require collaboration between artist and engineer. Moreover, this aesthetics problematises the nature/culture dichotomy in a manner that is of particular relevance to contemporary contexts increasingly infiltrated by technology. As a result, it can be brought to bear, fruitfully, on discussions of contemporary strategies in art and design, ecology and technology.

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PHYSICAL CINEMA: PRACTITIONERS AND RECENT PRACTICE

MICHAEL LEGGETT

Physical theatre, Live Art and Cinema have through performer and filmmaker established a vigorous practice in recent years, challenging the confines of more traditional art forms. Practitioners have come together with audiences to create between them a physical cinema converging as a series of spatial modes. This paper will outline some recent developments in this interdisciplinary field.

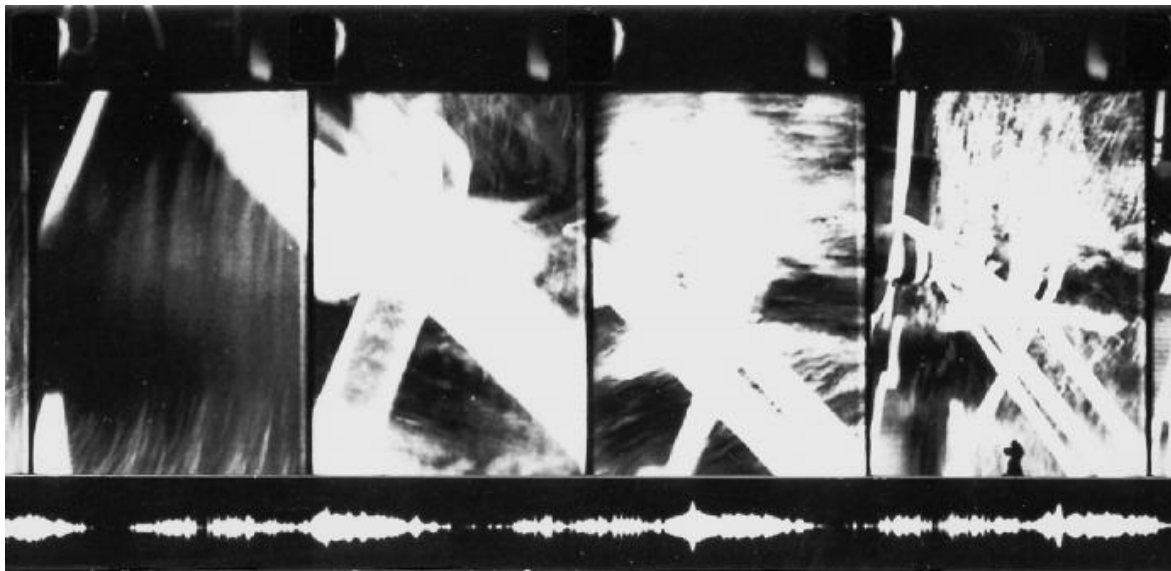


Fig. 1. Shepherds Bush, 1971, Mike Leggett, 16mm film, © Mike Leggett



Fig. 2. Brunel, 1983, Mike Leggett (filmmaker), John Downie (playwright) 16mm film and performance installation © Leggett & Downie



Fig. 3. Critical Path Lightways, 2010, Alan Schacher (Live Artist), Mike Leggett (filmmaker), video and lighting installation © Leggett & Schacher.

Physical theatre, Live Art and Cinema have through the processes of collaboration between performer and filmmaker, established a vigorous practice in recent years that challenges the confines of established art forms. Practitioners have come together with audiences to create between them, a physical cinema converging as a series of spatial modes. Place as much as practice determines the kind of experience a visitor, or participant, will encounter. Practitioners employ the phenomena of light and sound, darkness and silence, to propose courses of actions and ranges of responses for the individual participant to follow, or be provoked by. The participant becomes a performer, bringing the work into being through the realisation of a physical cinema. In performing the work, the participant echoes the practitioners own physical performance explored during the making of the moving image artwork.

Experiencing the phenomena of motion pictures in the past became associated with place – the building called the cinema – as certain conditions were required to enable the images to be seen and later, for them to be accompanied by sound. Technology expanded the requirements of place from darkened spaces in which light was reflected from a screen, to the semi-darkened space of the living room, with light emitting from the screen. Home movies spread the making of motion pictures, on film and video-tape, to a section of the cinema audience confident with manipulating tools; this included an ever increasing number of artists.

At the London Filmmakers Co-op in the 1970s, we became mechanics and chemists and set up printing and processing machines, adjacent to the cinema space and a distribution office; integrated practice was

how we described what is now called interdisciplinary arts practice. Using the printer for instance, I was able to duplicate a fragment of 16mm time-lapse film many times over by simply looping the original film footage in the machine (Fig.1). A body of work emerged exploring these kinematic principles, the fundamentals of cinema, focussed on material presence and structuring processes. The experience for the viewing participant as part of the process was, and remains, attentive, self-reflexive and closely perceptual. [1]

Part of this practice expanded away from the convention of a projection box facing a screen with the seated audience in between, toward open gallery-type spaces, where the audience moved between projectors and screens. Performance, in effect, occurred in front of both the camera and the screen.

Eve Kalyva's consideration of what constitutes a performance is useful in this context. She has noted:

"Surely there is the factor of threat and keeping it under check, for presumably ... one can interfere with a performance; or to put it another way, the whole point of a performance is this conditional interaction." [2]

Conditional interaction refers to the physical space between the audience and the performance. The invisible fourth wall in theatre or cinema is the membrane through which the product(ion) is delivered, regardless of the state, or frame of mind, of the audience. The agency of each member of an audience in conventional proscenium arch venues is restricted by custom, to removing oneself from the auditorium.

Such was the case in the Unword series of performances which commenced as a collaboration between myself, a filmmaker, and a visual artist; whilst a framing distance would be maintained by the physical delineation of the space, the rules for the audience kept them on the other side of the invisible membrane as spectators (of a spectacle) and not participants. The film (and later digital documentation), [3] as artworks in their own right, similarly maintain the distancing frame of the screen as a visible membrane. The conditions for response, reflexive rather than interactive, are reversed; with the liveness and the presence of the performer(s) removed, the condition of interaction changes the terms of individual agency. The screened image can now be approached and appropriated into the physical space of the viewer. [4] The modality of encounter switches from one tradition to another; from that of theatre and cinema, where agency is limited, to that of the gallery, where agency in the physical act of viewing is essential. As Kalyva has observed; "This act exposes the limits of social constructs such as subject and object, galleries and spectators, not at the level of the *effect*, but of the mechanisms that create, enable, and sustain such constructs." [5]

What is quickly understood is the relationship between the spatiality of the act of viewing – audience to performer(s), screen to viewer – and the hybrid spatiality of the images and sounds they observe.

Paul Dourish describes this as a "...social act of communication as participation and selection..", [6] and the performative occurs through both the advance of motion picture technologies – in this case, digital video and the video projector – and the willingness of the artists to experiment with the possibilities thereby afforded.

In tracking the morphology of the moving image in this way – from live performance to its record, a palpable presence when film is projected as performance, to many variations of encounter when video is projected – a physical cinema is located not in places but in attitudes and ideas.

My own practice included collaboration with playwrights, dancers, scientists, musicians, technicians, programmers and comedians in pursuit of expanding the boundaries of practice. A History of Airports [7] brought together all of these skills into a converted warehouse space through which the audience moved, encountering performers and screens during the 90–minutes of the show. Promenade theatre as it was known in Britain in the 1980s, brought together geographically local communities with professional artists. The restrictive and contained practice of theatre was replaced by a state of conditional interaction, that enabled spatial participation within the performance area whilst witnessing the work of the production through words, screens and physical presence.

In another similar collaboration, the convention of an audience facing a stage, like the audience facing a proscenium arch screen in the local cinema, was maintained. The mechanics of film back projection was visible as a part of the action in the performance area concerned with the career of the British 19th Century engineer Brunel. The roll of film containing moving images of carriage through the countryside, was loaded on the first of a row of projectors and then through a series of supports threaded through each of the six projectors on the gantry (Fig. 2). This was an analogue solution to a synchronised multi–screen array and thus required constant adjustment by a small team of minders over the film's ten–minute duration.

In the 2010 Biennale of Sydney, Isaac Julien showed the multi–screen work Ten Thousand Waves. [8] The 50–minute cycle of the work references the Chinese film industry, the rural peasantry, the diaspora and as a part of the narrative, emergency services footage documents the atrocious drowning of twenty–three Chinese migrant workers on the mudflats of Morecambe Bay in the UK during 2004. Visitors to the exhibit were able to promenade the 20 x 40 meter space, choosing where to stand or sit and in which direction to place their gaze. The sudden duplication of an image behind another encouraged the viewer to redirect their gaze to another alignment of screens, either by a turn of the head or a shift of position in the space. Interaction is conditional on engaging with the internationalist themes of the narrative, tightly controlled in the structuring of the work and, like Hollywood's product, imported into a suitably equipped venue. Using a hard disc array delivering perfectly synchronised sound and image across nine screens, the cinema system ran all day, every day for the three months of the Biennale; switching on at the beginning of the day, switching off at the end.

Physical cinema as promenade theatre is developed in my recent work with Alan Schacher at Critical Path, the choreographic research centre in Sydney. The interdisciplinary collaboration between a filmmaker and a Live Art artist and performer, a sound composer, other performers and an audience investigated 'the multiplication of space and presence to generate looped choreography–image systems'. (Fig. 3) The location itself, a heritage building, is the place and substance of audience experience, augmented by projected and performed interventions into the buildings fabric and its human context.

In all of these collaborative interdisciplinary works there are moments where for the viewer, the moving image is tenuous and seemingly fragile. There is a breaking down in the moving image's connection with a visual world which we can comfortably recognise. Jesse Shapins affirms in a recent book; "The shift enabled by new media, in particular the internet, mobile devices and wireless technologies, is the ability to literally transform the lived experience of the city into an active read/write databasetoday, the media artist can craft physical cinema that takes place on the streets of the city." [9] 'Taking place' means the act of participation, whether initiator or participant. For instance, the miniature works for mobile device made by the Sydney artist, Sam James are short poetic statements that like a book, can be opened at any moment in any place, to augment the passage of time. [10]

When the context is provided, as in Isaac Julien's work, the narrative of oppressed people plays out before us. Throughout 2011 we have become familiar with receiving moving images from the streets of the Arab world; moving in the sense that they were shot on mobile phones, but emphatically moving in the sense that we were encouraged to believe we were witnessing the transitioning of a group of nations into another stage of social and political development.

The use of mobile tools to both *organise* gatherings by mostly young people, and to *record* the events as they unfold have attracted much comment. The moving image recordings made and relayed to the world we experience only as observers of the media accounts, editorialised to encourage natural feelings of empathy and even admiration for their acts of defiance.

This is a physical cinematic practice based on the physicality of place and the dynamics of context, the tumble of events far from the planned situations encountered in the art gallery, festival and cinemathèque.

To haul these images into another but related context, the performers and activities develop as a series of durational and movement elements, approaching Deleuze's discussions of Cinema and the terms movement-image and time-image. The first term is the series of actions which relay the intent of the narrative – gatherings of people in public places to express the opposition of the governed to the governors. The second term can be applied to the fragments of moving image recording the events with mobile phone; the brevity of the images, the indistinct appearance and the media who convey them locally and to the world repeatedly for each and every News update, even several times in each bulletin. Though these time-images are different from the kind Deleuze described as existing in art house cinema. For the protagonists, the *indexical* moment of confrontation is relived each time they are seen again in the present. For the watching world the images are *icons* to a state of revolt. These moving images grabbed and relayed by mobile phone move rapidly between function and use; as Deleuze suggested, "A flickering brain, which re-links or creates loops – this is cinema." [11]

As expressions of faith in place and culture, these revolutionaries are the flux of change, an expression of a culture. This kind of mobility as an example of a physical cinema is the converse of the meanings fixed through representation in pictures and carvings say in Medieval and Renaissance churches, through which the audience move. The 'conditional interaction' requires that we remain quiet and contemplative as we move between the icons, in the same way as we regard the icons of celebrities performing on the screen in popular cinema today.

Conclusion

Developments in the interdisciplinary fields of art, science and technology have sought aesthetic change over the previous forty years, not only the last decade. From mobile screens and projectors that emphasise the cerebral experience of narrative encountered in the external settings of urban public spaces; to temporary projection surfaces and rigged light devices providing audience experience of the interior / exterior of place, activated through mobility within and around a specific locality. As a form of promenade theatre, new technologies have extended qualities and the range of audience experiences through touch screen and sensing systems. Accessing motion picture collections and augmenting performance as an extended practice, form the core of these experimental investigations.

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DEVIANT MEDIA TACTICS: CREATING FACES

Asko Lehmuskallio

Increasingly, forms of deviant acts have emerged: images are reworked, fake-identities employed and existing mediated communication is organized into novel forms. By focusing on Goffman's notion of 'face' as a situational image of self, constructed according socially approved moral attributes, this paper explores deviant media tactics as sets of images promoting other kinds of moral attributes, and thus other forms of maintaining face.

With increasing digital mediation of everyday communication, novel forms of deviant acts have emerged: political posters of candidates are reworked, fake-identities employed and existing mediated communication is organized into novel forms. Empirical examples of deviant media tactics abound. Take for example the reworked posters of parliamentary candidates during the election in 2011 in Finland. The acting prime minister at that time, Mari Kiviniemi, lent her face to her political party's campaign, accompanied by slogans such as "This country has to be led responsibly, with agreements, not by ripping it apart" and "Do you want to change Finland? So do I".

The 800 000 euro campaign was seen on television, the Internet, newspapers and outdoors, and was designed by the advertising agency Skandaali, a part of the Publicis Group Worldwide advertising and communications company.

With the help of digital software, animal rights activists targeted Kiviniemi's campaign in order raise attention to fur trade in Finland, and Kiviniemi's reluctance as prime minister to address animal welfare issues associated with it. Special attention in mass media was guaranteed when reworking some of Kiviniemi's outdoor advertisements, printing the reworks in billboard format and plastering them on top of the original advertisements. The advertisements were slightly modified, resembling the original ads, with slogans such as "Do you want animals in small cages? So do I" and "A fox without stimuli? Great."

Kiviniemi's mouth received red color connoting blood, but in a way that did not make it instantly evident if these were original advertisements or reworked.

These techniques of deviance, and the normative ascriptions associated with them, suggest a different morality than presented in the original advertisements. They bring to light issues that are kept invisible in the original communication acts, trying to engage interactive communication, instead of quasi-mediated communication.

Similar techniques are used for a wide variety of purposes, and techniques of deviance and specific normative ascriptions do not always go hand in hand. In making moral dimensions of visual communication acts explicit, as well as the mediating effects of the techniques used, we can come closer to working on situationally shared understandings of the kinds of communication environments we'd prefer.

Advertising as trapping

Advertising, as we all know, strives "to transform the way people think, feel and ultimately behave" as one of Publicis advertising networks, the Leo Burnett Group puts it on their website.

Following the idea of advertisements' transformative effects, advertising images, created in order to influence bodies' behavior, can be understood as traps, because they are constructed in order to impede the passage of unsuspecting bodies and hold them in suspension, eliciting particular response. Alfred Gell [1] has drawn this analogy to trapping for artworks with complex intentionalities, I suggest that the metaphor of trapping suits also advertisements.

Marketing language itself is filled with concepts from the world of hunting and trapping. 'The hunt for customers', 'cool hunting' and 'customer trapping' are examples for the use of this kind of language. In saturated urban environments, images are used in winning customers, by claiming that, as the German marketing authority Werner Kroeber-Riel famously suggests, "Images are quick shots in the brain" ("Bilder sind schnelle Schüsse ins Gehirn"[2]). The assumption behind this idea is that images are processed by beholders subconsciously and emotionally, and that images are remembered much longer than for example text. There are various counterexamples for this general assumption about images, but of importance is a widely employed reasoning why images are used in advertising in order to influence customer decisions.

In designing advertisements, advertisers inscribe intentionality into the artifacts created in order to guide the behavior of those seeing them. The created traps are both models of their creators, as well as models of their victims, of those to be trapped. Functional traps are not all purpose devices, but they have to fit the behavior of those to be trapped, their techniques of the body. A significant amount of marketing research, for example, is done in order to learn how customers use the kinds of products advertised, in order to attune both products and advertisements to customers' behavior. When behavioral action is known, it can be modified with the help of successful advertisements.

Advertising traps are not lethal, nor do those trapped necessarily experience being caught by a functioning trap as negative, but often enjoy finding for example novel products, using them with ease and buying them for themselves and as gifts to others. In political advertising before parliamentary elections, an obvious purpose of advertising traps is to get people voting those advertised for. Political advertising, done in order to influence and possibly change citizens' behavior, is a means to change previous voting behavior in favor of new candidates.

Advertisements are interesting examples for discussing deviant behavior, because many advertisements per se constitute a norm for public communication, a communicative form accepted as part of our everyday experience. But the intentions behind advertising are geared usually towards *transformative* effects, towards *deviating* from earlier behavior. Of the two examples presented, the 800 000 euro campaign is seen by many as a form of 'standard' and 'normal' communicative behavior, because explicitly in that way influential societal actors communicate publicly. Only the rework is considered deviant, because it deviates from this widely accepted communicative norm.

This shows the relationality of deviant behavior, since actions can only deviate from something that is not regarded to be deviant, such as 'normal', 'accepted' and 'standard' behavior.

Embodied everyday communication

The digital mediation of everyday communication lures us sometimes to think that these kind of acts break with former communicative practices. In a way they do, since the communicative means we have

today at hand differ from the ones used earlier, but too often the discourse on the effects of digital mediation forgets the elementary interconnection between bodies and media. Our techniques for communication are first and foremost techniques of the body, [3] although they take in a 'digital era' artifactual form. Hans Belting [4] suggests that we use our bodies as media in communication, and it is in his sense that Erving Goffman can be understood as a media theorist with a fine-grained understanding of the ways in which we use our bodies as media in interaction. The medium Goffman has paid most attention to in his approach to studying communication is the human body.

Goffman has studied presentations of self with the help of theater metaphors, focusing especially on how bodies present self in different situations and why they do so. Instead of being interested in the informative dimension of communication, he focuses explicitly on the ritual side of interaction, on the ways in which communities and communality is created within interaction. Goffman uses face as his main concept around which he explains the communicative rituals in reciprocal interaction. Importantly, face is for Goffman "an image of self delineated in terms of approved social attributes." [5] With face-work, the work needed to create situationally proper face, we create images of situationally positive social values, such as honesty, trustworthiness and friendliness. With the help of face, created as an image on one's body serving as medium, we seek to orient interaction to a specific direction. By performing according to accepted social attributes and re-presenting them in mutual interaction we create actively moral sociality. Proper face serves as an index for mutual solidarity.

In face-work, we perform moral characters that are emotionally rewarded or sanctioned. Performing proper face is valued and acknowledged by interactional partners and is emotionally satisfying, whereas unsuccessful face-work accounts for blushing, shame, embarrassment and other unpleasant feelings. What is especially interesting here is that in face-to-face interaction mutual face-work has agency in stabilizing social interaction.

The original political advertisements shown suggest a specific face 'delineated in terms of approved social attributes' which voting citizens' would choose as their candidate when voting on election day in the voting booth. If the advertisement is successful, and transforms 'the way people think, feel and ultimately behave' it maintains social order, hierarchies and thus power structures and does not deviate from a situationally shared sociality. The acting prime minister will continue as prime minister after the elections, and the communicative methods chosen have worked in 'trapping' as intended.

Goffman's theory of face rests on Durkheim's understanding of the sacred. According to Durkheim the social reality of communities is constructed substantially around sacred things, which are special and treated with prohibitions. Durkheim believed that communities stay together by fostering the special and prohibited sacred with the help of rites and beliefs. The sacred is for Durkheim a universal phenomenon: without a common sacred communal life does not exist. [6]

Maintaining face is in Goffman's understanding sacred, which we guarantee with the help of a wide array of interaction rituals. Interaction rituals uphold common morale, and thus shared ways of situationally presenting face. Face is a sacred part of interaction that creates a temporary bond between those who interact, with elaborate interaction rituals advising how to deal with things treated as sacred. From a social perspective, this kind of a "ritual is a mechanism of mutually focused emotion and attention producing a momentarily shared reality, which thereby generates solidarity and symbols of group membership." [7] These symbols of group membership might be preserved in visual form on media that extend the ephemerality of face-to-face interaction.

By challenging particular ways of presenting face we challenge the moral foundation of interaction rituals. When we look at someone for too long, or when we do not look at her at all, we violate situational interaction rituals, situational visual orders. The face, as a sacred part of interaction, is both used in order to create 'successful' interaction rituals, but as well in desecrating communicative partners. The reworking of Kiviniemi's face in political advertisements by adding red paint to her mouth suggesting blood, and using slogans in her name that create other associations than the political advertisement as a trap for voters initially intended, suggests other kinds of moral attributes, and thus other forms of maintaining face.

Surveillant subversion

The kinds of tactics presented by those in communicatively weak positions are often applauded by critical audiences who want to question existing social and visual orders, and especially so if questioning the moral foundations of contemporary socioeconomic structures. Although highly creative, interesting and to some extent efficient (and at times illegal), these kinds of communicative techniques are not preserved to critical minorities, but employed as well by actors with a heavy supporting apparatus, often for very different kinds of purposes than employed in small-scale activism.

A telling example comes from Simon Menner's work at the Stasi archives opened for research, in which he found visual strategies employed in intelligence and surveillance work. [8] The Ministry for State Security (Ministerium für Staatssicherheit), also known as Stasi, was the intelligence service of the German Democratic Republic (DDR). Their aim was to ensure that deviant acts in the population were not made, and if they were, that deviance could be uprooted, if necessary.

Menner discovered two practices of special interest for our discussion: the first was the use of Polaroid photographs for taking pictures of homes to be searched just before the actual search done, so that all items could be placed in correct order again. The intention of this practice was that the people whose homes were searched never noticed any searches done. The second example is a photo set of spies presenting various outfits in order to 'fit in' into everyday social situations, so that they are not identified as spies. Here the deviant acts, morally questioned by those not participating in them, were masked as being part of situationally shared visual orders that seemed socially approvable. Any discreditations were done later on, after first suggesting a shared social reality with 'mutually focused emotion and attention producing a momentarily shared reality'.

Goffman focuses in his discussion of interaction rituals explicitly on expressions given off, which are non-verbal ways of influencing social interaction, as done in the case of Stasi spies dressing in order not to deviate and raise suspicion in the eyes of others. He attests communication partners a high skill in reading expressions given off, understanding that specific kinds of gestures, attires and verbal expressions are specifically crafted for particular situations. But in situational interaction, talking to Stasi agents dressed up as tourists for example, we have to "accept the individual on faith, offering him a just return while he is present [...] in exchange for something whose true value will not be established after he has left [...] our] presence." [9] Deviance is thus not always recognized as such before it is possibly too late.

Unintended subversion

The examples discussed are examples of intended actions deviating from everyday action precisely in order to trap and transform those interacted with. Instead of sharing situational morality, the interaction partner's face is questioned either during the communication act itself, or later on when evidence of deviant behavior has been found. If the trap set up triggers, morally despised behavior is made known and is, perhaps, sanctioned or transformed.

In our contemporary here and now, marked by global flows and translocally shared practices, a wide array of deviances do not result from trapping, intending to transform the behavior of others, but due to cherishing situational practices shared with people dear to oneself. Public praying, hand-holding or kissing is in some places seen to deviate from morally expected behavior and thus contests situationally shared interactions. When done by migrants, tourists, 'parasocial' beings on television or in movies the deviances are often unintended. Too often in these cases special techniques are policed (e.g. specific techniques of praying, hand-holding or kissing), instead of discussing the actual moral implications behind these acts. In quite a few cases, if actually taking up the moral foundations of specific actions, the techniques employed would not be that problematic after all.

The role of mediation

Although Goffman's approach is especially valuable and useful for studying deviant acts, focusing solely on symbolic action does not give us any information about the role of the specific medium used to create and regard normative or deviant images. The role of devices used is here secondary, since from this perspective on images the role of the medium used is, surprisingly enough, not essential for discussing interaction rituals. In Goffman's theory social interaction is ordered around the face, an image of the self, which is regarded as a nearly anthropological universal. Thus various versions of presentations of self can be found in different contexts, face-to-face, on profile pictures of social network sites or ways of decorating one's home.

The transforming effects of mediation are best understood in relation to embodied actions, and in relation to the inherent processuality of situational interaction. Our bodies are our first medium used when interacting with others, used in order to show social cues of accepted or deviant behavior. The mediation of everyday communication, while sitting at computer screens and navigating via various software applications from e-mail programs, social network sites to blogs and news sources translates the kinds of cues that can be used in social interaction. Our social encounters in these kinds of digital environments are often shorter, more condensed and interaction partners have, if they choose so, usually more time to prepare their communicative acts compared to the time available in face-to-face behavior. This opens up various spaces for communicative acts that can transgress expected processes of social interaction. Activists have famously made it to television interviews and spurred heated debate with fake identities just by creating a web site and an e-mail address suggesting to represent an institution or person in whose name they communicate. When contacted, their mails have seemed professional enough in order to convince their interactional counterparts of their performed identity. [10] These acts of deviance done in order to discredit other kinds of actions considered immoral have been possible explicitly because of changes in the mediation of communication. Less cues given off, prepared well enough in advance, have made it difficult to not to 'accept the individual on faith, offering him a just return while he is present [...] in exchange for something whose true value will not be established after he has left [...] our] presence.' Often when it is too late.

Technology employed can itself lead to deviant acts, as has happened to quite a few who have either not understood the mediations they use in communicating in the first place, or the changes employed later to these systems. Social network sites that are constructed in ways that do not let users control their communicative acts as they have been used to have led to deviant acts that would have been considered normal among the intended communication partners. Because of this, employees have been fired, social relationships have been broken, and some know a little more about their relatives than they'd possibly like to. [11]

When differentiating between techniques employed and the normative ascriptions associated with them it becomes clear that they are often not similar 'things'. In our everyday interaction they are nevertheless tightly integrated: it matters how we maintain face.

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POP ENTRAINMENT

Jon Leidecker

As the techniques of Audio Collage slowly migrated from formal conceptual practice to the commercial mainstream, a mood of cautious experimentation gave way to cavalier misrepresentation. But even the most problematic examples of music that caricatures the cultures from which it borrows still inevitably raise useful challenges to ownership, and the paradigms of authorship and individual intent.

Entrance

By the early 1960's, the location of what the listening audience perceived to be a musical composition was in the process of migrating, moving from the classical domain of written notation on paper to the carefully engineered audio recording. Tape collages, new compositions created from pre-existing recordings of earlier ones, made this process overt and audible to the listener. A commonly reoccurring concern in many of these early pieces was the juxtaposition of the music of different cultures, an attempt to compose the music of what Marshall McLuhan referred to as the Global Village. The idealized definition of music as a universal language could now be examined and challenged with formal explorations, both in Utopian pieces attempting to synthesize new harmonies between disparate musical disciplines, such as in Stockhausen's "Hymnen", Teiji Ito's "Tenno" or Ruth Anderson's "DUMP", and in critical investigations that juxtaposed seemingly similar sounds to underline the wildly different meanings when those sounds were heard in their original contexts, such as Richard Maxfield's "Bacchanale" and James Tenney's "Viet-Flakes". Some of these new harmonies were beautiful, some were violent, and which of these were which depended on the perspective of the listener. But the works of this early period were not easily mistaken for mere entertainment – the pleasures they evoked were often the exact result of the questions they were formally asking about this new village, and what it even meant that this music could now exist. As the influence and the practice of these art music collagists were taken up by others, first by experimental pop musicians, and later by commercial Hip Hop artists, some of those questions were drowned out by other concerns. Questions of authorship, collaboration and exactly what agencies are being expressed in a tradition that were naturally raised by the earliest tape collages often seem to go missing when music settles into the guise of simple entertainment. But we find that those questions are never lost entirely, as they lie too close to the intrinsic nature of the practice itself.

Experiment

"Sometimes it seems to be better when the musician cannot hear the other one during his recording", said Holger Czukay about his classic track "Persian Love". A student of Stockhausen's and a founder of the legendary experimental German rock group Can, the track is the centerpiece of his 1979 debut solo album "Movies", and is one of the first pop songs whose lead vocals are sourced entirely from a sampled recording. Built around a shortwave recording taped off from Radio Tehran by the composer which has

been painstakingly synchronized to new music written and performed by Czukay, the cascading rhythms of the original Iranian vocalists have gone missing beneath a swaying 2/4 beat. But their melodies still seem to fit perfectly over the slowly modulating chords, creating a truly striking hybrid. After the seamless first impression, the piece reveals itself as having required hours of meticulous listening and editing in order to exist. The hybrid is also one that could have only been realized through appropriation; the vocalists' mastery of their own idiom would have almost certainly made it impossible to sing the same lines in accompaniment to the shifting key changes suggested by Czukay's new chords. In much the same way that sheet music allowed composers to fashion and perform harmonies more complicated than performers could improvise, recordings allow for cross-cultural fusions to become audible. And once made audible, the most promising and relevant of these hybrids can be intuitively learned and evolved by musicians in live practice.

David Byrne & Brian Eno's 1981 album "My Life In The Bush Of Ghosts" expanded the concept of Czukay's track to an entire album of songs whose lead vocals were sampled from talk radio samples and globally sourced field recordings of spiritual and religious ceremonies. The track "Qu'ran", which sampled Algerian Muslims chanting the Koran, drew the attention of the World Council of Islam in the UK, who sent Byrne & Eno's label a letter the year after the record's release to signal that a recitation of their holy book to funk music constituted a religious offense. Byrne & Eno responded by agreeing to remove the track from future European and eventually all editions of the record. For all of the positive connotations that the word 'Hybridity' has for artists, in Post-Colonial Studies the word is precisely used to describe the "new transcultural forms [created] within the contact zone produced by colonization". Or as Byrne later noted, musical fusions often result not from collaborative choice but as the result of "unfortunate circumstances, like slavery or something else." Though some have decried what they see as a pointless act of self-censorship in an age where the track can easily be found online, the choice to quietly withhold the track without a mention of its existence on the 2006 global reissue of the album provides an interesting example of an attempt to show respect to the sampled culture, long after the initial act of creation.

These two albums stand at the mid-point between their early 60's art music collage predecessors, and the appropriations of Persian, Egyptian and Indian music that would explode into the language of Hip Hop in the late 90's.

Entertainment

A host of lawsuits in the late 80's and early 90's brought the Golden Age of Hip Hop to an end, the musical development of which had been defined by an increased density and wider range of juxtaposed sample sources, as typified by bands like De La Soul and Public Enemy. Increasingly forced into accountability in the wake of these lawsuits, record labels began the meticulous work of clearing the samples uti-

lized by their artists. Firms specializing in securing these rights began to flourish, offering specialized relationships within the music industry that helped them broker the best deals between labels. By the mid to late 90's, the artists working within the intrinsically referential genre of Hip Hop were generating such revenue that it always seemed to be better to be safe than sorry when it came time to license nearly any sound or concept utilized or even remotely referenced in their songs.

So it is all the more interesting to observe the utterly cavalier attitude these same labels adopted when their artists began to sample outside of the known products of the Western record industry. Jay-Z's 1999 track "Big Pimpin'", produced by Timbaland, is built around a four bar loop of the 1957 song "Khosara", composed by Baligh Hamdy and made internationally famous by Abdel Halim Hafez, one of Egypt's most beloved and popular performers. The loop was initially thought to have been rerecorded with modern production values by Timbaland, but was later found to have been directly lifted from a cover version found on Hossam Ramzy's 1995 CD "The Best of Bellydance from Egypt, Lebanon, Turkey". On an album whose liner notes are filled with publishing credits for the samples used on nearly every track, the lack of publishing information for "Big Pimpin'" was striking, especially considering its debt to a song that was instantly recognizable to an audience of millions outside of the United States. Similarly, the publishing for the 2002 track "Addictive", produced by DJ Quik for the artist Truth Hurts, failed to disclose Bappi Lahiri as the composer of the song "Thoda Resham Lagta Hai", which provided the 16 bar foundation on which all the additional melodies are based. And audible in nearly every second of the song is the unmistakable voice of the great Bollywood singer Lata Mangeshkar, creating a presence so strong that even listeners unfamiliar with the original song heard the production as a particularly daring act of musical borrowing.

Artists have traditionally enjoyed a tiny bit more latitude than journalists when it comes to issues of plagiarism; giving a personal voice to material drawn from a shared heritage often requires the artist to erase the quotes -- effectively to steal, though often with the assumption that the audience will recognize the material as a reference. Commercial artists usually relinquish this freedom, or more to the point, have their people deal with the thornier issues of attribution and licensing. It remains a point of confusion as to why DJ Quik's label found it unnecessary to secure the rights to a song featuring the voice of one of India's most beloved and instantly recognizable voices. And while the artistic imperative to freely create variations on the work of others must be evaluated separately from the more mercenary concerns of the businesses that exist to monetize that work, in the cases of "Big Pimpin'" & "Addictive", the carelessness with licensing is reflected in the carelessness in which the musical samples are presented. The cultural heritages of Egypt and India become exotic settings for lyrics which glorify the pleasures of either being a pimp or belonging to one.

Both of these songs have since prompted lawsuits making claims on the order of half a billion dollars. DJ Quik's assertion that Lahiri & Mangeshkar had been honored by his use of it was rejoined by an attorney representing their studio's publishing company: "The curses, the sexual suggestions -- these are against the Hindu faith. Their religious convictions have not been honored or respected." In an interview, Lahiri himself went all out and accused those who had sampled him of cultural imperialism. Lahiri, whose

songs include so many flagrant & uncredited 'cover versions' of Western pop hits that they are the subject of several web sites devoted to connecting the dots, is clearly no stranger to musical borrowing himself. But if a charge of mere plagiarism might have been hypocritical, the charge of imperialism retains a sting.

Articles appearing in weeklies, academic journals, and the internet by authors such as Richard Zumhawa-Cook and Wayne Marshall have already eloquently described the offensive aspects of entitlement and caricature embodied in these appropriations. One nearly runs the risk of appearing naïve or idealist by arguing in favor of them, by claiming that these are songs that act as works of collage simply by virtue of introducing these intact musical works into the new context of the Western radio airwaves, that music itself always trumps lyrical content, that doors left open to new cultural references not only stay open but invite listeners through them for further experiences. As Tina Chadha quoted DJ Rehka in the *Village Voice* in 2003, "I see Indian kids in a club who get so excited when these hip-hop songs come on, because for that one moment they feel visible. They don't see the misrepresentations." Those misrepresentations are there,

but they are not seen because they carry less of a long term impact than the sound of the music itself which is now an increasingly accepted feature of the American sonic landscape.

Eric Sermon's 2002 song "React" is a perfect illustration of this early awkward stage in Hip Hop's fascination with non-Western pop music. A song in which the sole purpose of the sample is to support Sermon's boasts of worldwide fame, the chorus drops an interpolation of the Bollywood song "Chandi Ka Badan" as sung by Meena Kapoor. Making a point of being confident ignorance of her Hindi lyrics, he responds 'Whatever she said, then I'm that'. It is perhaps only a beautiful coincidence that the vocal fragment, chosen for its sonic appeal, is actually a perfectly framed sentence: "If a man wants to commit suicide, what is there that you can do?" The degree to which you are indifferent to the range of meaning embodied in the music that you are sampling is literally the degree to which you are only embarrassing yourself. And yet, the result of this chance is a song with multiple authors, an inadvertently profound dialogue that resonates with far greater depth than either the author or the appropriated collaborator could have intended. Historically, collage, as an art form, has a habit of cultivating these exact coincidences and collisions, even now that its practice is largely taken for granted, decades after having been assimilated into the commercial mainstream.

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RE-CONCEPTUALISING THE PLAY-ELEMENT IN ELECTRONIC ART

OLLI LEINO

This paper seeks to clarify the ambiguities at the overlap of electronic art and computer games by reconceptualising the play-element evident in both as not only a set of stylistic and creative strategies which we might approximate as “playfulness” but also as a material affordance of a particular kind of audience engagement, which is referred to as “playability”.

INTRODUCTION

The technological make-up and interface conventions of many electronic artworks invite configurative audience practices which resemble those we are familiar with from the context of computer game play. Not unlike the players of computer games, audiences of electronic art can be invited to use, for example, a touchscreen, mouse, or other pointing devices to manipulate audiovisual representations on the screen, perhaps triggering a variety of spectacles along the way. In this light it is not surprising that some contemporary critics have seen it necessary to be concerned about the associations between play and media art. For example, at ISEA 2008, Daniel Palmer, in his paper *The Critical Ambivalence of Play in Media Art*, [9] concerned with media art’s “association with entertainment spectacle” suggested that if “media art aspires to be taken seriously by the broader contemporary art world, the links between media art, children and mass culture are fatal.” Not only do computer games have a certain stigma within the discourse of institutionalized new media art, but the description works also the opposite way. For example, on the online discussion fora devoted to the topic of computer gaming, “art games” is sometimes used as a derogatory euphemism.

While computer games and electronic art have many qualities in common, they are clearly two different cultural phenomena. However, given the hardships that await those who seek to define either (computer) games or (electronic) art, it is feasible here to consider any account of differences between the two as referring not to the qualities of the works themselves but to the institutional, economical, cultural and political conventions and practices that surround the creation, distribution and consumption of both computer games and electronic art. Instead of dwelling on the conventions that separate the phenomena, this paper attempts to see through them into the forms the “play-element” takes in both electronic art and computer games.

BEYOND THE CONFLATION OF PLAY AND ART

In Western thought, the concept of play has always been closely intertwined with that of art: it occupies a central role in many aesthetic theories and over the course of art history, various movements and traditions have made use of ideas of play in different forms. However, we must note that the play of light sought after by the impressionists, the playing of *Exquisite Corpse* by the Surrealists, and finally the activity of play as an engagement in an electronic artwork are all significantly different phenomena, which come together only in a benevolent colloquial application of the term “play”. Sutton-Smith, [11, pp 133-4] who attributes the origin of the conflation of art and play to the romantic parallel between children’s art and modern art manifested in the attempts to appreciate and emulate the “infantile innocence”,

suggests that the conflation obscures “whatever the true relationship between play and art actually is.” The conflation rightly suggests that some of the concepts we may associate with play, like some of those mentioned by Caillois; [2, pp 10-11] freedom, separatedness, uncertainty of outcome, and perception of alternate reality, seem all equally fitting for the descriptions of both artistic and ludic practices. However, if we stick to Caillois’ definition of play (ibid.), we find other concepts, such as non-productivity and rule-governedness, which seem to hold a slightly more marginal significance if applied to artistic practice.

While there certainly is enough evidence to claim that art and play are associated, it is important to bear in mind that the simple concept of “play” masks a variety of practices (some of which we would be better off conceptualizing through the notion of a game) and modes of experience not necessarily compatible with each other (cf. Malaby [8]). Thus, addressing the play-element in electronic art requires more specificity than what can be attained by understanding “play” in terms of the lowest common denominator in all examples fitting under the umbrella of play and art intertwined. Pursuing this specificity, I shall in the following distinguish between playful strategies and playability, where with strategies I refer to the decisions that an artist makes in the process of creating a work.

PLAYFUL STRATEGIES

Among what we might call playful strategies we have play, or perhaps more accurately playfulness, as a referring to a work’s theme or style. Consider for example the impressionists depicting the ‘play of light’, where the players, assuming whose involvement is a precondition for any significant application of the notion of play, appear as embedded in the work: neither the artist nor the audience are playing, but the work can be described as representing some kind of play (cf. Sutton-Smith [11, pp 135-47]). In addition to play as a thematic metaphor, we can identify creative methods that fall under the umbrella of playful strategies. Here the artist-player’s choices precede the work, and thus the play is not ‘inside’ the work. Consider *Exquisite Corpse*, the Surrealist drawing-game, as an example of a creative method, users of which are engaged in an activity resembling a game, which in the end produces an outcome identifiable as a discreet work.

This description can be applied also on the tradition of generative art, which Gallanter [4] describes as a practice making use of a procedural system which when set into motion assumes a degree of autonomy and produces a work of art. Generative art, in terms of its implementation of rule-based like principles is not unlike surrealist games – the significant difference being however that the procedural system may not need intervention but can itself occupy the position of a player. However, the emphasis on the outcome challenges the applicability of the notion of “play” for the description of creative methods. Following Caillois, [2, pp 43-55] we may observe that the more emphasis we place on the outcome of the game/play activity, the further the activity moves toward its “corruption.” Hence any rationale for addressing it as “play” instead of for example as a value-creating strategy diminishes. It seems that the game-like creative methods that are geared towards producing a discrete result supposed to sustain hermeneutic projects can be distinguished from game/play per se, in which the process itself is the primary locus of experienced significance.

This does not mean simply that some works require a focus on the process in order to be understood. Consider, for example, Allan Kaprow’s happenings. In *Household* (1964), a group of women were asked to lick jam off a car. To make any sense of *Household*, we must begin with the process, as there is no ob-

ject to analyse, but we will not find the locus of significance within the process of the participatory performance of *Household*, but somewhere on the fringe between the process and the discourses surrounding it, including those of theatre and audience. Consider *Tetris* (Pajitnov 1984): while it can be subjected to a multitude of interpretations, inherent significance unfolds from process of playing *Tetris* as it gets underway. The player is presented with a condition that her survival depends on her ability to keep the stack of falling blocks from reaching the top of the container. The *Tetris* artifact evaluates the player's performance and decides whether the playing of the game should end or continue. At will, the player, who we assume is voluntary and thus desires to be a play, can extract a number of value assertions from her condition: for example, constructing unbroken lines of squares at the bottom is good as it keeps the stack from reaching the top thus the player from ending up in the undesirable state of 'game over.'

FAILURE AND INTERSUBJECTIVE SIGNIFICANCE IN PLAY

To illustrate the idea of locus of significance within the process, let us imagine *Tetris* without the possibility of failure, allowing the heap of blocks to rise up indefinitely. From the condition of the player of this game we could not extract the kind of assertions mentioned above. Seeing any difference between the significances of constructing broken or unbroken lines using this or that colour would require reference to outside *Tetris*, not unlike making sense of *Household* requires looking at outside the performance. Playing the ordinary *Tetris*, we soon find out that the colours mean nothing and unbroken lines are good. Hence, we observe that if the possibility of failure is removed, the locus of significance moves outside the process.

The failure here is not a purely subjective failure, as in a failure to interpret or to appreciate. There are works which invite some kind of 'mental play' in their audiences – regardless whether we consider it as "aesthetic play" or as solving a crime mystery depicted in a novel. We can consider these works, like *Tetris*, as using play as a means to engage their audiences, as suggested by Sutton-Smith [11, p.141] regarding "literature of nonsense and humor". Reader of such works, is, according to Sutton-Smith, "immediately at play in an imaginary world of textually incongruous transformations." However, regardless of how we define play, we can observe that the existence of a possibility for a failure on the audience's part distinguishes between the ways in which *Tetris* and a novel use play to engage their audiences: the condition of a reader of a book does not include the risk that some choices lead to not being able to continue reading. Hence, perhaps works which incite 'mental play' would be better referred to as works exemplifying playful strategies.

As observed before, many new media artworks invite input from their audience, perhaps through an interface easily associated with computer games. Often, the audience's choices have consequences in what they see as output from the work. This is similar to how computer games work. We might consider the audience engaged in this activity of input-output as 'participating' or 'performing'. Again, by looking at the kinds of failures afforded we can distinguish these participatory and/or performative phenomena from each other. The failure in *Tetris* discussed previously is not a failure defined primarily by the social reception situation - it is not an ambiguous failure to behave or to use something 'properly,' which might happen in the input-output-situation around a participatory/performative artwork. While the possibility of this kind of failure creates a tension that perhaps contributes to the attraction of "performativity" and/or "participation" in the context of electronic art, it is important to observe that the standards by which the audience's performance or participation are measured are as ambiguous as those suggest-

ing that one interpretation of a novel is better than another. If an artwork is able to evaluate the audience's performance, and decide based on this evaluation whether the audience should be allowed to continue interacting with the work, we can find a more descriptive term with which to refer to it than simply 'participatory' or 'performative'. This term is, I suggest, playability, considered as an affordance in the work.

PLAYABILITY AS AN AFFORDANCE

Playability refers to a work's ability to effect successes and failures on its voluntary users. The criteria for distinguishing a successes from failures are contained in the work itself, not unlike in an "ergodic artwork" which Aarseth [1, p.179] defines as one "that in a material sense includes the rules for its own use, a work that has certain requirements built in that automatically distinguishes between successful and unsuccessful users." However, when referring to computerized forms of play, it makes less sense to talk about rules, as they exist in computer games only through a benevolent reading, at least if we consider rules as they exist in traditional games – as, for example like Huizinga [6, p.8] suggests, something the players have to remember in order to play. If we instead understand these playable artefacts as endowing their audiences with a degree of freedom while simultaneously making the audience responsible for this freedom, we can describe the distinction between a success and a failure with no reference to rules. Failure is the player's choice that led to the material impossibility of continuing playing, and success is her privilege of subjecting her choices to be evaluated by the artefact again. This is what I have elsewhere [7] referred to as the gameplay condition. Thus, in addition to playful strategies, we can establish the concept of playability, referring to a work's affordance of being played. Playability does not exclude performance: the kinds of failures associated with 'performance' and 'participation' and defined by the reception situation, are possible around playable works, which can also incite 'mental play'.

The notion of playability allows distinguishing between works which at a first glance might seem similar – those which invite participation, performance, interactivity, or navigation, and those in which the activity, whether playful or not, is evaluated by the work as described previously. Similar specificity is brought by the notion of playability to the application of the term "navigation" to describe that which goes on between a work and its audience. It allows us to distinguish between works that invite us to navigate merely for the sake of "exploring" the work, and those which specify where to go. The former works, while exemplifying playful strategies, are not playable, unlike the latter. Similarly, while the popular online game *Farmville* (Zynga 2009) certainly is playful in terms of its audiovisual appearance, it does not contain a possibility of failure and is thus not playable. Consider also the Japanese *Konapun* toy set, which we might read as a simulation of cooking à la Frasca [3]: among the behaviours retained from the original activity are for example mixing of ingredients inside containers and setting the finished products on a plate. The standard by which the user's performance is evaluated is arbitrary. A parent might tell a child that her performance was superb even though the dish hardly resembles the one depicted on the box of the *Konapun* set. In contrast, another cooking simulation, *Cooking Mama* (Office Create 2006), is much less ambiguous: not only the player gets a score and Mama either smiles or her eyes glow in fiery red, but unsuccessful cooking attempts prevent the player from advancing in the game while successful dishes unlock new recipes. While both *Konapun* and *Cooking Mama* are simulations, *Konapun* is playful, but not playable, whereas *Cooking Mama* is both.

While the idea of a possibility of failure leading to a locus of significance being within the process itself poses certain challenges for the interpretation of playable works. Previously I have mentioned that the colours of *Tetris* blocks mean nothing, while simultaneously suggesting that if there was no possibility

for failure, we would have to refer to outside *Tetris* to find out whether the blocks have any significance. We may observe that playable works contain the standards for their own interpretation, but in doing so we must remember that the interpretation for which standards are contained is not the only interpretation to be made. Instead of referring explicitly to 'meaning,' perhaps the observation about the colours of blocks in *Tetris* would be better formulated as: treating blocks of different colours differently would not help the player to survive in the game. However, it is important to bear in mind that a successful pragmatic, or, survivalist interpretation of what is going on in a game is a precondition for any interpretation about the game's significance in the larger socio-cultural context. Exploring the consequences of one's choices in relation to failure is necessary before one is able to see why for example *The Marriage* (Humble 2007) has its name.

Playability prescribes a sense of purpose to which any kinds of interactivities (participation, selection, performance, navigation, exploration etc) the work may afford are subordinated. Hence, from the perspective of playability, the actions available for the user of an interactive artwork appear sometimes rather purposeless, not unlike actions in a game of Tetris from which the possibility of failure was remove. While we must note well that the domain to which the concept of playability refers is not the only domain of experienced significance in the reception situation, perhaps the generation of new media art audiences who have grown up with computer games are accustomed to expecting intrinsic significance from the works with which they interact.

CONCLUSIONS

In relation to both Palmer's concern about the links between entertainment spectacle and media we can observe that "playfulness" and "playability" are two separate phenomena, whose coexistence in either electronic art or computer games is accidental rather than essential. Based on what has been said, it should be possible to come up with a definition of "playable (art)works", those from which all the playful "childish" elements are weeded out but which nevertheless subject their users to a gameplay condition. However, assumedly the definition and that at which it would point would be fairly conventional.

While distinguishing playfulness and playability is analytically sensible, it is not to impose a normative agenda of keeping them separate. Especially interesting are those examples in which playfulness as an artistic strategy or a thematic metaphor manifests itself through playability. These we can, following Sutton-Smith [11, pp 147-8], consider as "meta-play", defined as "that which plays with normal expectations of play itself". Galloway's [5, pp 107-126] six strategies for "counter-gaming" are relevant in terms of meta-play, outlining a playing field for meta-play on the conventions of computer games. Another interesting conflation of the playful with the playable is what Ryan [10] calls "dysfunctionality", taking variety of forms. As an example of "politically motivated dysfunctionality", Ryan cites *September 12th* (Newsgaming.com 2005), a game which makes a point by not being winnable. Also Sicart & Wilson's [12] abusive game design strategies, which seek to highlight "the dialogic relation between player and designer" through placing the player in an awkward and/or uncomfortable position, deserve attention as forms of meta-play. In relation to the gaming public's tendency to downplay the so-called art games, we can only remark that while in terms of expressive possibilities of the media, there is room for a variety of artistic strategies for negotiating the relationships between playfulness and playability, the gamers' expectations might sometimes clash with the artistic sensibility of stirring the old in search for the new.

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PRECARIOUS FLUX

DONNA LEISHMAN

Mixing theory with applied perspectives this paper generates a series of questions and describes how contemporary social technologies have significantly changed our practical reality, a reality where human experience and technical artifacts have become closely intertwined. The paper's conclusion explores the ontological consequences of this change and the potential in establishing 'Precarious Design' practices and methods as a response.



Samples of the positive social and digital media branding straplines.

Introduction

The physicist David Bohm (1980) posited that the “world is full of movement and becoming, in which any thing, caught at a particular moment, enfolds within its own constitution – the history of relations that brought it here.” [1] This is an intriguing position and one that in spirit captures the inherent limitations of a singularly defined experience and gives prominence to the notion of complexity and “being in flux.” Some years later and based in another field entirely, design thinker and curator Antonelli (2008) opined that “... core human experience is rendered more urgent by the speed at which technology is moving...” and that a great number of us “...routinely live at different scales, in different contexts, and at different settings – Default, Phone-only, Avatar On, Everything Off on a number of screens, each with its own size, interface, and resolution, and across several time zones.” [2] This modern way of existing is often described as appealing, stimulating and empowering. Various social media platforms, digital agencies and technology developers all strive to assist, to connect us through these multiple interfaces and time zones. The corporate/civic/personal rhetoric of social media is driven by the positive (see Fig 1.). However a few notable counter voices have arisen. The Baroness Greenfield inspired a fierce bout of media anxiety in April 2009 after she published an article in the Daily Express titled “How Facebook addiction is damaging your child's brain: A leading neuroscientist's chilling warning” in which she claimed that there were (probably) lasting neurological effects from frequent exposure to social

media websites. Since 2007 there has been increased pressure from the American Medical Association for the American Psychiatric Association to include internet addiction, video game addiction, e-mail/text messaging along with sexual preoccupations in the upcoming 2012 Diagnostic and Statistical Manual of Mental Disorders (DSM – V), the standard diagnostic text used by psychiatrists worldwide, and on the 16th of February this year Physiologist Kathy Charles, writing in the *New Statesman*, likened once again the social network to something compulsive and destructive, claiming that: "Facebook keeps users in a neurotic limbo, not knowing whether they should hang on in there just in case they miss out on something good." This paper will attempt to avoid the techno triumphalism of being better 'connected' and similarly the paranoia around digital media's so called deleterious mental effects on users. An idea that will now be revisited and debated in British parliament after many sections of the British press blamed social media arenas for aiding the London, Birmingham, Nottingham, Bristol and Liverpool city looting problems on the 6th, 7th and 8th of August 2011. Rather this paper accepts that we are now in an age where cultural and technological change has created a new reality of sustained rather than temporary movement. Although Bohm and a plethora of thinkers, scientists and artists have either instinctually known, or through intellectual observation made peace with this worldview, this paper shall explore the problems and potentials that arise when applying such a notion to the everyday user of technology in society.

Context Theory

The majority of users remain uncomfortable around confusion, and if we do encounter it we still expect confusion to be of a fixed and short nature, it's a basic tenet of the knowledge is power aspiration. Human Computer Interaction (HCI) was a field that historically had not been concerned with representing complexity or mirroring the precariousness nature of our existence. Rather HCI's goal was to gain user satisfaction, to make digital tools more receptive to our needs. Media Art arguably has never contained any stable goals or ideologies and is populated by a mix of pioneering creative technologists (Robert Hodgin, Jer Thorp), obsessives (Joshua Davis) and niche collectives (Antirom, c5corp).

There is a danger associated with being in flux, it suggests change, pressure, and movement even Bohm's 'becoming' implies an end rather than an endless becoming. A fundamental of good HCI design was to eliminate or reduce user confusion, to allow us to be stable, to have permanence, to perceive and connected to and transact with the systems and devices that we need. User legibility was preferred over ambiguity. Design thinking was all about making things better a form of modernist 'heroics'. Recent developments in the field have seen a turn towards experience design, described as a situation where experience and technology are intrinsically enfolded. Lucy Suchman an anthropologists specializing in the digital described the "relations of human practice and technical artifact [have] become ever more layered and intertwined. At the same time that the technological project is one of congealing and objectifying human activities, it is increasingly also one of animating and finding subjectivity in technical artifacts. The assimilation of lived experience to technique goes both ways, which only makes the project of re-imagining technological objects the more urgent." [3] This turn to experience with a need for engagement with dense multidisciplinary methodologies will inevitably expose the field to the poststructuralist problem of endless subjectivity. In traditional dialectical tension to Design, Art has traditionally functioned as society's most deliberate and complex means of self-expression and as such is comfortable with subjectivity. When artworks follow anti-hierarchical ideologies (post Dada, Fluxus et al.) a certain level of dissonance can be felt by the user as they struggle to identify what are the expectancies of them given the lack of explicit rules. The ensuing paradigm of uncertainty, ambiguity and ambivalence in early twentieth century Art preceded Bauman's turn of the century notion of 'liquid modernity,' [4] a new

modernity in which fractured timelines were normal, where social structures were no longer stable, and a state of being where fixed concepts like ‘career’ and ‘progress’ could no longer be meaningfully applied.

Context Corporate

Today’s torrent of societal change and unrelenting uncertainty has left many industries sluggish and effected many corporate identities (consider the state of journalism, publishing, music distribution, retail). The speed to change is recognized (no longer new) but many are now feeling the impact of this sustained change. For Designers questions now arise about their role in solving societal problems and how do they confront the idea that a theory of everything is needed, that everything must be considered before anything can be addressed? The traditional path to a clearly defined problem and solution becomes a challenge, perhaps even futile in this period of dense movement and uncertainty.

Context Ludic

Cultural theorist Huizinga (1938) conceptualizing play stated that within a game you are “...spatially and temporally segregated from the requirements of practical life”. [5] Whereas now to be spatially and temporally segregated (from workmates, lovers, family and friends) are now common requirements of practical life. Perhaps there are merits to re – exploring the ludic discourse above and beyond the past the preoccupation with narrative aesthetic and revisit the psychology of role – playing. Role – testing or –playing is expected to be transitional - done in our youth, but within the social network and digital gaming contexts we can extend this process. What happens if you can’t manage our new ‘practical life’? In this scenario what does suspension of belief and or self now mean. The gaming analogy can also be distinctly felt within the observations of Jenkins [6] who described a move away from transactory culture into participation where play is becoming a default method in engagement and knowledge attainment (and almost universally seen as a good thing).

Context Social Skills

Western society has been through an adjustment; we have adjusted to accelerated change, hopefully learned most of the tools required for this new practical reality. Graduating from the novice state towards the intermediate level we psychologically lean on our tools (Charles 2011) to such an extent that dissociation anxiety has become a popularly understood term – describing our contemporary difficulty when we do not have access to our connective technologies. There have been recent attempts at convergence, by bringing together all our feeds, our emails, texts, tweets into one interface. [7] This attempt to unify the users experience is a logical but perhaps anachronistic goal when each media instance fosters a different cognitive connection, simply blending these mental conditions this may not be a unifying reductive solution. We ‘need’ these tools to provide different things for us: acts of sharing (Blog, Twitter, Podcast, MySpace, YouTube, Flickr, Vimeo), discussion (Twitter, Newsvine, StumbleUpon, Youtube) and connecting, re – connecting (Facebook, MySpace, LinkedIn, Friendster) are all distinct practices. Each of these different functions requires significant effort to immerse and different commitments in terms of assessing, changing and publishing content; each interface (after all conceived as a discrete experiences) cues the user into different mindsets. Bringing them all together may result in a useful Meta view of activity but perhaps not in itself a unifying experience that can solve the more fundamental mental and emotional conditions of confusion, noise and anxiety.

Context Depth

Mike Bergman, credited with coining the phrase 'DarkNet' has said that searching on the Internet today "can be compared to dragging a net across the surface of the ocean; a great deal may be caught in the net, but there is a wealth of information that is deep and therefore missed". [8] Intermediate media users can quite effectively create a closed private network of devices used for file and content sharing such as the encrypted messages sent via BlackBerry to various mobs during Britain's August 2011 riots. There is also evidence that users are finding new modes of communication and semantics [9] such as the increase in personally curating our entertainment and nested linguistic meaning. Whereby a message or sentiment is embedded, disguised or hidden within a linked text or video, which can only be truly understood by select users who are aware of the specific total (online and offline) context of the user. The deep and cognitive Web is several orders of magnitude larger than the surface or representational Web. This level of subjective and structural complexity means that the Internet still constitutes a free activity where we can move around, sign-in, explore, search, look, understand and comment without a sense of sanction. What then if anything constitutes expert usage, traditionally denoted as prolonged intense practice through experience and education, in a world full of multiplicitous digital experience? Antonelli (2008) addressed the role of design in a world which humans have surpassed their Enlightenment roles as neutral observers and have become 'actors on the very forces of nature'. Implying that to effective one must be active within the complexity. She also saw a need for users to develop personal elasticity, that being: "the by-product of adaptability and acceleration, elasticity means being able to negotiate change and innovation without letting them interfere excessively with one's own rhythms and goals." This paper also considers if to be expert now means to be agile and surface than deep. Huizinga's (1938) seminal quote goes on to extend the description of games in that we are also "bound by a self-contained system of rules that holds absolutely." As stated acceleration of the Internet and its online culture left the corporate world far behind, conventional advertising strategies were ineffective, the environment was to a large extent unstructured. New rules were slow in coming; what remained meanwhile was self-governance. We explored our user role and sense of self in a freer system of ethics and behavior – many used alter egos, role –playing and exploration of promiscuity and the taboo [10]. What constitutive and regulative rules now control our behavior?

Context Semiotics

If we remain in a gaming mindset, then the conventional wisdom is that life shall intrude, that there is a porous magic circle. In offline, online and everything in-between people are crossing this reality / non-reality threshold all the time in both directions, "carrying their behavioral assumptions and attitudes with them" (Castronova 2005). [11] Practically testing or breaking through the offline and online bubble has resulted in some contentious legal interpretations such as the recent conviction that Paul Chambers received for his 'tongue-in-cheek' tweet about blowing up Robin Hood airport in Britain back in January 2010. A vigorous debate has ensued around appropriate contextualization of Chambers actions. The presiding judge interpreted that "*Any ordinary person*" would interpret the tweet as alarming. [12] The notion of ordinary is now in itself a fraught concept. What is ordinary social insight when at different scales, in different contexts, and at different settings? There are still no clear regulative rules that prescribe acceptable social conduct/communication within social media (the UK Digital Economy Act 2009 is mainly interpreted as copyright protection). The Chambers case shows how problematic words without appropriate context are.

Context Physical

Service design and co-design go some way to addressing the HCI context of complexity but from a procedural and often corporate view. When attempting to congeal and objectify contemporary human activities is not surprising that Design has moved away from an industrial to emotive centered approach. An excellent example of this is the 'The We Feel Fine' project (www.wefeelfine.org), an emotional search engine started in 2009 whose goal is to collect the world's emotions to help people better understand themselves and others. Having come through the other side of dematerialization, re-materialization is also becoming more prominent. The uptake in programming projects such as Processing (Java) and openFrameworks (C++) by non-computer scientists is making engineering physical and digital interaction more achievable (see 'Pigeon d'Or' by Tuur Van Balen). Another example of rematerialization is Tim Kring's augmented reality game 'Conspiracy For Good' which confidently attempts to make a virtue out of the game fiction / social reality divide. This paper proposes that such practices could be considered as Precarious Design.

The Precarious Designer

When asked to reflect on the art of the first ten years of the millennium, art critic Hal Foster [13] focused on the 'precarious', art which functions as a social – political critique, work which foregrounds its own schismatic condition, its own lack of shared meanings, methods, or motivations, Art if you will, that captured a sense of cultural vertigo and liquidity. Applying Foster's description, a Precarious Design paradigm could be a community of precarious designers who create experiences and or artifacts from a position of living and observing and testing within acknowledged and accepted precarious contexts. Such a designer accepts acceleration, recognizes the fluxing user position by being one. As with Foster's precarious art precarious designers can function within a post – conceptual space where there is no distinction between works of self-expression and works of social critique (i.e. they are part and parcel of the same activity). Precarious design by collectivizing or collating works could also give life and voice to the broader fluxing context, objectifying places within the complex digital–physical continuum of our current reality a chaotic continuation of uncertainty.

Conclusion

Both applied and artistic practices are striving to synthesize and express what constitutes a core human experience and develop methods to survive and succeed within our fluctuating context of sustained extraordinary change. In a sustained world of acceleration the aims of design become interesting. If we fully embrace Bohm's implicate possibilities then, as Suchman writes: "Integration, local configuration, customization, maintenance and redesign on this view represent not discrete phases in some 'system life cycle' but complex, densely structured courses of articulation work without clearly distinguishable boundaries between." [6] User experience should no longer be explored in terms of a singular moment but also over longer periods, or indeed we need to consider that the different interfaces work as differing forms of personal histories. What then becomes significant is establishing what people are actually doing and what people need to do.

Problematically this practical reality is both without perceived sanction and seems to offer limitless individual agency; however, we are not free of corporate or political and legal influence and ramifications.

Users need help in delineating new cognitively useful, safe and or dangerous personal and legal boundaries. Given the cognitive freedom of theersatz ludic space, existence feels quite different. Without rules our identities and ontologies need support. In addition to the recent strategic investment of the designer as facilitator or conduit in multidisciplinary methodologies (Britain's Design Council), this paper offers up the notion of the Precarious Designer, who by way a personal insight via a personal/niche epistemology, is well positioned to conceive of these new expressions and being lighter of foot is able to dance along with the inevitable redefining moments within society and technology.

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IN TIMES OF CHANGE: AN INSTITUTIONAL PERSPECTIVE ON COLLECTING AND CONSERVING BORN DIGITAL ART

MELANIE LENZ

The social and networked aspects which permeate the process of making and dissemination for many New Media Art works brings to the fore questions not only about how works are made and used but how they should be collected and conserved. Within the museum context it is the care of the collection for future generations and public access that drives the need for expanded research into the collection and conservation of digital art.

The social and networked aspects which permeate the process of making and dissemination for many New Media Art works brings to the fore questions not only about how works are made and used but how they should be collected and conserved. Within the museum context it is the care of the collection for future generations and public access that drives the need for expanded research into the collection and conservation of digital art. This paper uses the V&A's recently acquired born digital works *Shaping Form 14/5/2007* by Ernest Edmonds, *Study for a Mirror*, 2009-2010 by rAndom International and *Process 18*, 2010 by Casey Reas, as case studies to explore the acquisition, documentation, preservation and the challenges of working in new ways.

The Victoria and Albert Museum is the UK's national museum of art and design. In its early years as the South Kensington Museum, the V&A attempted to unite the arts and sciences. Its collecting policies, which today include born digital acquisitions, continue to emphasise the importance of technique, process and innovation. The V&A's acquisition of contemporary born digital works builds on the museum's existing comprehensive holdings of historical computational work, providing a route for understanding the contemporary significance of early computer artists' work. The V&A received two major collections of computer-generated art and design, one from the Computer Arts Society, London, and the other from Patric Prince, an American art historian and collector. This combined with more recent acquisitions has solidified the museum's status as the national collection of computer art.

The early history of the museum's computer art acquisitions offer important insights into the impact of preservation strategies, the construction of art history and the potential bearing this has for collecting contemporary digital art. The museum began acquiring computer-generated art and design as early as 1969 with the purchase of a portfolio of prints from the 'Cybernetic Serendipity' exhibition held at the ICA in 1968. However until recent years acquisitions ceased, in part due to the difficulties of preserving fragile computer-generated material compounded by, and contributing to the exclusion for many years of computer art by the mainstream art world. The Museum's 2009/2010 display entitled 'Digital Pioneers' sought to redress this and raise awareness of this lesser known field of art and design. The display ran consecutively with 'Decode: Digital Design Sensations', a major exhibition curated in collaboration with onedotzero and showcased the latest developments in digital and interactive design, from small, screen-based, graphics to large-scale interactive installations and new commissions. It included works by Danny Brown, John Maeda, Rafael Lozano-Hemmer and rAndom International. A later prototype of the latter's work was subsequently acquired by the museum; a decision that was informed by the close working relationship between the V&A Conservation Department and the artists.

In May 2010, the V&A acquired *Study for a Mirror* by artist collective rAndom International. Described by the artists as a contemporary 'light painting' it uses face recognition technology with software to transfer the onlooker's image onto the screen. *Shaping Form 15/5/2007* by Ernest Edmonds, acquired in April 2011, is a generative and interactive artwork using software to create a continuous stream of abstract images that evolves in response to external stimuli. Casey Reas, who together with Ben Fry developed the open source software known as Processing, is the latest digital artist whose work has been acquired by the Museum. *Process 18* by C.E.B. Reas is a visual and kinetic system.

The challenge of preserving these works rests on the question of how born digital art can be understood and used in the future when systems, software, and knowledge continue to change. The vulnerability faced by all software-based artworks is its susceptibility to change. The obsolescence of hardware and format, the bespoke nature of the code and the rapidly changing systems and technical environment all pose risks. To reduce these risks the museum has developed a series of steps, firstly identifying what elements need preservation. Through a series of discussions with the artists the museum ascertains the significant properties assigned to the concept, material components, the experience and perceptual quality of the art and identifies which component parts are interchangeable. Details about the code are recorded such as what software the programme is written on and how it is saved. The production path is documented along with information on how to recognise failure detailing what constitutes acceptable and unacceptable changes.

Migration and emulation are the two strands through which preservation is managed. Migration, the process of transferring data from one platform to another, is undertaken at the earliest opportunity and where possible saved in multiple formats. As part of an ongoing migration programme the V&A is currently investigating the feasibility of saving the code for all three case studies on VADAR, the museum digital repository. Changes to the appearance of the original format is a risk associated with migration, thus emulation offers an alternative method involving imitating the original look and feel of the piece but by different means. Where possible these methods are discussed with the artists at the point of acquisition. The current strategy relies on the museum continuing to record as much metadata as possible including descriptive, technical and artist-dependent; developing procedures for the acquisition of software-based artworks; identifying tools useful for preservation and initiating a program to test recovery strategies, recording results over time.

The acquisition of born digital artworks has highlighted the need to work in different and more open ways, drawing on the strength and knowledge from an array of people across the museum, in addition to expanding and sharing expertise externally. The social ideas encompassed in the participatory works and collaborative approaches of the artists have given rise to intriguing questions and new challenges both in terms of preserving, conserving and documenting the concept, experience and physical components of works. The V&A has learnt invaluable lessons with each new born digital acquisition which in turn has informed how the museum operates.

THE CREATIVE IPOD LISTENER

Tuck Leong & Nina Gram

In this paper we suggest that people's iPod listening and their interactions with iTunes software result in experiences that are suffused with emotional, physical and social potential. Listeners can use music in order to manage, enhance or facilitate different situations, affective states, processes or activities. This paper will explore how this is informed by listeners' complex understanding of musical genre and style in their collection.

Introduction

Studies of iPod (and mp3) listening have primarily focussed upon the listeners' wish for auditory control and their attempt to withdraw from public spaces.

[i]

This focus has led to a skewed understanding of iPod listening as being an exclusive and excluding activity where listeners are only interested in their personal listening experiences and their individual auditory version of the world. However, the technology of the iPod and mp3 affords more than just an auditory 'shield' from the world. This paper describes a range of possibilities that includes emotional, physical and social potential when listeners engage with and manage their music through interfaces such as iTunes and while listening 'on the move'. We argue that listeners, through a complex understanding of their music, can creatively design their listening experience according to different situations, use music to manage their emotions and space, and in the process contribute to their sense of well being and adding to their sense of self. But first, we will briefly examine the technology involved and its affordances.

[ii]

The iPod - design and technology

People's listening experience via an iPod or other mobile mp3 players is greatly influenced by the associated design and technologies. Firstly, the compressed size of mp3 files means that listeners can easily carry their entire music collection with them. Although the compression may sacrifice some of its audio quality, listeners can quickly and easily choose the exact track to listen to whilst on-the-move and under different situations. The mp3 format makes it easy to buy and share music, and applications such as iTunes facilitates the organisation of the music according to genre, mood, artist, tempo etc, allowing listeners to create different types of playlists, and to add meta-tags (ID3 tags) to their music. Thus, people's interactions with mp3 when listening to the iPod is very different from the interactions with and listening to analogue music which have previously involved taking either the LP, tape or CD in your hands, placing it in the stereo and perhaps reading on the cover or flicking through the booklet. With the

iPod, listeners manage the music on their computer without having any direct physical contact with the music. Furthermore the possibility of listening using the shuffle mode affects the way we listen to mobile music and the experiences we have while listening. Whether shuffling from different playlists or from the entire music library listeners have less control over their listening thus allowing themselves to be surprised, captivated or even to encounter meaningful experiences like coincidence and serendipity. [\[iii\]](#)

Thus, besides supporting the individual's shielded listening, the affordances of the iPod (discussed above) allow people to not only develop an awareness of their music, but also its social and psychological potential in different situations. In this light, listening is not only about finding your favourite song. People can use music to stage different activities for self and/or with others under varying contexts. Our discussion will present this as the different types of agencies afforded to listeners when using the iPod.

[\[iv\]](#)

The agencies can be described as either having a social function, a mood managing function, or as being connected to an activity.

iPod agency

SOCIAL AGENCY

iPods can be plugged into sound systems for social listening. They are often used at parties where people in turn take on the role as DJ mixing the music from their private music library or using self-constructed playlists that suit the current mood. In more intimate situations, iPod listening can be part of a group activity and be central for the constitution of social situations and collective memory.

" My friends whom I have not seen for nearly a year were visiting. So we were looking at old photos from high school while listening to music that we used to love during that time. My iPod was plugged into the sound system. At one stage Laura pointed to a photo and reminded us that in that photo we are dancing to a Timberlake song and then at the end of that current song, the iPod threw us the same Timberlake song from the photo! Spooky! The coincidence heightened the party mood! We all shouted and started dancing!" (Xana, 2007)

Another example of the social agency afforded by the iPod is found amongst music enthusiasts (both amateurs and professionals). One informant reports for instance how a party band is using drum tracks on their iPod instead of an actual drummer. On their band poster they are promoting and branding themselves by focusing on their unusual instrumentation. On the poster it says: 'iPod on drums!'

Besides allowing for shared listening experiences, the iPod can also be used as a way of developing and communicating one's personal taste in music and in the process, one's personal identity.

[\[v\]](#)

MOOD MANAGEMENT AND MOOD CHECKING

The use of music to manage personal moods and feelings has been emphasised by many (e.g., Bull, 2005, 2008; Leong, 2009; Simun, 2009). Here, we want to examine how this is executed. Researchers usually examine listeners' emotional 'peak experiences', such as whether they are very happy, sad, angry or other strong and easily definable emotions.

[vi]

Under such situations, listeners often know exactly what they want to hear and what will put them in the desired state of mind. Nola explains:

"Let's say that I have a broken heart. That is a classic. [...] Then you can have this empty feeling [...] And you can enhance that feeling and perhaps give it meaning for instance by listening to depressing music and in that way having a sort of cleansing moment or by creating a space that makes sense of the emotion you are feeling. [...] At the same time the music can help to enhance or support any happy emotions. That is amazing." (Nola, 2010)

However, more frequently than not, our emotional states are often somewhere in between these extremes, which makes a definition of the private mood and the subsequent choice of music challenging. Here, we show that under certain circumstances, listeners use the shuffle mode as a way of 'checking in' or locating their own emotional state.

"Walking to Uni to submit my assignment and I had my iPod in my hand constantly pressing forward in shuffle. I am not quite sure how I am feeling and I am using the skip button to try and find a song that fits this mood." (Josh, 2007)

And when listeners succeed in managing moods through their music listening, they are relieved. It gives them a feeling of accomplishment or success:

"It is one of those small victories in everyday life [...] It is not a giant boost of happiness but more like pressing the elevator button and discovering that the lift is already there at your floor. If this happens at the University it is the greatest joy of all. You feel on top of it all." (Frederik, 2010).

ACTIVITY BASED AGENCY

The organization of the music according to mood management is closely connected to the activities that accompany the listening. Often the choice of music will depend on a combination of the current mood of the listener and the activity that is carried out while listening to music. If the activity requires energy the listener can use the music to get in the right energized mood. The iPod user is very aware of these qualities of the music and of mobile listening and this consciousness shows in the organization of the music. One iPod user for instance reports how she listens to her playlist 'Run for it' when she goes out for a run. The numbers on this playlist are carefully chosen in regards to tempo and mood and the order of the songs is organized to fit a certain development in intensity throughout the workout.

Patrick donates blood once every two months and he chooses a particular playlist to listen on his iPod:

"I have one playlist of a classical composer that I listen to when I'm giving blood at the blood bank, cos I can get through a whole symphony in that time, makes the time goes very fast" (Patrick, 2007)

Several informants also use the iPod at the grocery store. One of them is easily affected by the crowd and the noise level of this place. He uses the private soundtrack to shut out the many inputs that characterize this public place. Another listener uses the small breaks in a day, for instance while standing in line at the grocery store, to create positive experiences for herself.

"A lot of people say that they listen to music to avoid wasting time. They think they are wasting time while standing in line in Aldi [a supermarket chain]. I feel like listening to music gives me different experience [...] It cannot make the trip to the supermarket shorter, but it can make it more exciting. It gives it meaning." (Rocha, April 2010).

As mentioned the iPod can have a practical function for listeners that work with music either professionally or as a hobby. One informant, Frederik, a drummer, uses metronome tracks when rehearsing to help him keep time. Furthermore he uses the iPod to prepare for band rehearsals:

"...And if I am going to rehearsal and I am not prepared, then I can prepare my self using the iPod on my way there" (Frederik, 2010)

The negotiation for music that best fit the activity appears to be learnt through previous experiments and with particular goals in mind.

"When I choose a playlist for work, I need something that keeps it light and kind of happy, bouncy. You don't want something that depresses you and the customers. For drawing, it's about keeping my attention focused on what I am doing. For drawing, I am the biggest procrastinator, takes me forever to draw things. So I need some music that didn't distract me completely. Need it to keep me chained to my desk." (Xana, 2007)

Our empirical material has also revealed that iPod listening is not suited for every situation. For instance most informants do not use mobile sound media when they are tourists in a new city.

"Let's say that I'm in Mumbai for the first time. Then I wouldn't feel qualified to create a space there [...] does that make sense? [...] Well I think by automatically blocking out things from the beginning I would drown the great experience it could be seeing a place for the first time." (Nola, 2010)

'Frederik' also explains how the music can be a disturbing element when you are in a new city. However, it depends on what you are hearing, he says:

"It mustn't be attention-demanding music. [...] It mustn't be great art haha..." (Frederik, May 2010)

AGENCY OVER PLACE AND SPACE

By using their iPods plugged into sound systems, some listeners show how they enact agency over their environment – the place and space they happen to be in. This can be related to who else are in the space. For example, Xana 'broadcasted' certain tracks from her iPod through the home sound system as

a weapon against her flatmate whom she was not getting along with. This was because her flatmate, Emma watches certain TV shows loudly that annoys Xana. In fact, this cheered her up.

“Thinking about procrastination and how I should be doing work. Also about how stupid Em’s TV shows are. Action: choose music that I know Em hates and play it loudly – so music as weapon of noise pollution. Wahaha!” (Xana, 2007)

Xana also uses her iPod to feel more comfortable and ‘in charge’ of her environment at work. In her new job, she deals a lot of with strangers. So when she was told that she was allowed to bring and play her music at work, she carefully curated a playlist to make her feel in control and more confident.

“I have a playlist with songs that reminds me of happy times, my good friends, family and so on, as well as songs that I know that are popular with most people. By having these familiar songs and being in charge of the soundscape of the shop, I feel more confident when dealing with strangers.” (Xana, 2007)

The creative iPod listener

These different ways of using the iPod bear witness to a new type of listener – one that has a well-developed comprehension of the potential of music and mobile listening. As mentioned the design of the iPod and the ‘materiality’ of mp3 files bring about a different interaction with music when buying it and listening to it. Even though people don’t have any physical contact with the mp3 files, the above examples of the different agencies attached to mobile music listening seems to indicate that people’s relation to the music is as personal, emotional and extraordinary as ever. The physical interaction is now with the iPod. The listeners carry it close to their bodies, and while listening they are often in continuous contact with it as they manage the volume and the order of the songs. One informant even explains how he does this on the move without even looking at his iPod. This familiarity with the iPod suggests intimate relations between the iPod and the listener. In some situations the listeners feel that they need the music in order to be comfortable

Even though there is a bodily familiarity between the listener and his iPod, the listening experience, when using headphones, is very different from hearing music on a stereo or at a live concert. The iPod listener will not have the same bodily reactions of the bass resonating in his chest or the bass drum vibrating through his body. However it seems that iPod listening still engages the body and that the combination of body movements and music are essential to the experience:

“It creates a possibility for contemplation. Partly because the body is activated... like walking to the beat of the music...that is pretty normal, I think [...] 120 beats per minute that fits just right.” (Jeppe 2010)

As mentioned the listening also affects the body by the energy and tempo of the songs getting the listener ready to perform physically or calming him down after a busy day. According to Shuhei Hosokawa (who has examined *The Walkman Effect*, 1984) the body is central to the concept of the Walkman. In fact he states that:

“Whether it is the Walkman that charges the body or, inversely, the body that charges the Walkman, it is difficult to say. The Walkman works not as a prolongation of the body (as with other instruments of musicam obilis) but as a built-in part or, because of its intimacy, as an intrusion-like prosthesis...” (Hosokawa, 1984:176)

Hosokawa believes that the Walkman opens up the body and initiates a process of aestheticisation of urban space. Furthermore the listening process becomes a way of interpreting our selves as the music seems to come from within our own bodies. When applying this notion of a musical interpretation of the self to our current examination of musical agencies it seems to characterise the process of managing personal moods through mobile music listening. By constantly (perhaps unconsciously) evaluating one's personal mood and organizing the music according to one's physical and emotional needs the listener is trained in and becomes familiar with his own reactions to certain situations and to different music genres. The mobile sound media becomes tools in a personal education of the self.

The compressed quality of the mp3 files also affects the role of the listener. According to Jonathan Sterne an mp3 file takes up a tenth of the space of a song on a CD. This extensive compression works because the listener unconsciously fills in any missing auditory information making the music seem the same as when it was heard on a CD or the like. However, somewhere in the middle ear we can detect these reductions in detail and complexity.

[vii]

This change in the quality of the music also affects how we listen. As mentioned many iPod listeners report how they use the mobile music to manage their mood or create memorable experiences in different situations. Nevertheless when they really want to focus their listening and enjoy a piece of music they primarily listen on their stereo at home or go to live concerts.

It is interesting then, how the mobile listening, if it is not necessarily a focused listening, can give the listener strong emotional experiences. The French sociologist Antoine Hennion explains this by describing how iPod listeners construct their own passivity letting themselves be swept up in the music and in the emotion. [viii] So instead of popular music pacifying the listener, as Adorno describes it, the listener actively chooses to surrender to the music and create a personal and emotional experience. As such the listener is very much in control throughout the listening. Even when he himself might describe it as 'losing himself in the music' the experience will often be staged and designed.

This controlled and staged listening can however in some situations influence the experience of situation's authenticity. The listener Nola describes how it feels when she becomes aware of her own staging of an emotional listening situation:

"...and it was like 'uh, now I'm in the country, and it is so beautiful' [...] and then suddenly there was this song, that did not fit in at all [...] and it was so funny because I suddenly realised what I was trying to do, and that sometimes I fail at it, and how ridiculous it sometimes can be, right?" (Nola, 2010)

Conclusion

This paper has presented different ways people exert agencies during music listening through their iPods. We have shown how the iPod is used in many different situations and with different emotional, physical or social needs/agendas. Throughout, iPod users are found to understand implicitly how different kinds of music can affect both their sense of self and its influence over different social situations, whether or not they actually succeed in managing their situation and mood. But regardless of the outcome, the iPod listener is found to interact actively with the music, and sometimes in novel and perhaps

a more unexpected manner. Thus, far being the listener who is locked and immersed in their sound bubble, iPod listeners are actively involved in their soundscape: creatively tuning, adjusting, and designing a soundtrack that not only support their sense of self, identity, mood, and aspiration, but also their activities and surroundings.

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 8. Gomart & Hennion: *Music Lovers*. Here taken from Juslin & Sloboda: *Music and Emotion*.

THE DOUBLE HELIX AND THE OTHER-FRAME

Malcolm Levy

Throughout the history of the camera, a main thread of discussion has been on the mechanical repetition of photography, camera usage, and how aspect can alter, reshape, and change our existing understanding of the tool itself and its usage. 'Other-frames', specifically references abstract frames that are not typically part of the normative captured sequence, offering an alternative methodology within digital photography.



Future Cities, Shanghai, 280"

"No doubt we know less and less about the nature of the image, an image, or the image."

_Raymond Bellour, The Double Helix.

In both painting, and more recently in photography, the conversation around abstraction, with regards to its meaning, creation and place within art, has been an animated one to say the least. Currently, with the advent of digital technology and numerous artistic practices (both digital and film) related to the debate, the discussion has taken on new meaning. One area of study that has been emerging in the conversation focuses on the location at which digital and analog practices meet.

Within this current discourse around Abstract and Concrete practices and Video / Still Image / Photography, the computer chip within the digital camera is an object of much contradiction and beauty. How this small sensor can be manipulated to reveal frames that are in between, or not really part of the actual logical frame rate pattern is both a striking and explosive phenomenon. Through practicing techniques of movement, focus and speed, there is a location where the digital chip stops working properly, where it cannot handle the workload it is being given. The implications of this are the creation of an array of visually abstract stills.

Other-Frames

Throughout the history of the camera, a main thread of discussion has been on the mechanical repetition of photography, the usage of the camera, and how these usages can alter, reshape, and change our existing understanding of the tool itself and its usage. The camera 'chip', or sensor as it is known, based on its makeup and intended action, has only certain processes and actions that it is designed for, in terms of its use. The processes create 'other-frames', specifically referencing frames that are not normally part of the sequence and capture methodology of digital photography. 'Other' in this case lies within its historical philosophical usages of the term not as oppositional, but more so as that which is unconscious or silent.

Techniques with the ability to affect the usage of a digital camera above and beyond the normative practices of commercial video and photography are varied. These techniques exist outside what is considered relevant to the specific needs or usages of the camera with its normative function of traditional documentation. Some of these, based on quick movement, speed and focus in particular, have the ability to create Abstract Expressionist-like formulations out of what could be best described as analogical methodologies within a digital landscape.

The frames live beyond what would be possible in a film reel due to the undiluted analog nature of film in comparison to the digital-analog hybrid form that exists within the digital camera/process. Within the process of slowing down imagery, frames are found that were never intended to exist, and more so, never conceived of as ever being part of the process. In using the chip of the camera, not for its original intended purpose, but for an originally unintended purpose, views beyond the human gaze begin to appear.

The "Chip" itself is an abstract notion. Much in the same way as a synthesizer, the current digital cameras run on mini micro-processors that are then amplified to create imagery. Though the common name for these devices is a chip, they are more accurately referred to as image sensors. In looking at both the CCD (charge-coupled device) or CMOS (complimentary metal oxide silicon) image sensor, what is being created is a mix of analog and digital processes, and therefore reactions and endpoints in creating imagery. The Chip, or image sensor as it is technically referred to is a device that converts an optical image to an electric signal. The purpose of the sensor is to convert light into electrical signals.

As with the sounds that can be extracted sonically from synthesizers and other sorts of outboard equipment, the reaction of the amplifiers in a chip to speed, light, noise, and other exterior factors can manipulate the chip with mystifying results. As opposed to the 'invisible', being that of the darkroom, in this case it is the chip itself, *which is the digitized duplicate of the filmic process of the filming - darkroom process*. The visible process of the camera (dominant action) is pushed aside to give precedence to the usually invisible process (submissive action) of the inner workings of the camera's chip and functionality).

In analyzing the mechanical functions of a camera recording an image, Raymond Bellour investigates the possibilities of abstractions and narratives that can pass through this process. Specifically, Bellour identifies the possibilities for frames outside of the normative process to exist: "This is what, in their way, the words passages of the image refer to. First of all, the ambiguous word *of* includes the sense of between. It is between images that passages and contaminations of beings and systems occur more and more often, and such passages are sometimes clear but sometimes hard to define, and, above all, to give a name to."

These passages and contaminations, as Bellour correctly describes, are specifically, 'Other-Frames'. The digital space within the analog chip, when exhausted beyond its capabilities and capacity for retention, lies very much in the world of the 'in between'. A newly found nature of the image comes through, in this case redefining a space where it didn't exist before. This requires us to question not only what it produces or *could* produce as art, but, above all, to evaluate what becomes of art when it is confronted with a different structure outside of semiotics, and specifically what it signifies (or de-signifies) within its abstracted result.

Bellour referred to this as the Double Helix, specifically the work that lives between the lines of what is foreseen, and unforeseen by science with regard to nature. In analyzing the apparatus, there are two forces, (arguably more) working together to create these new realities, and once the movement of video comes into play, there is the ability for loss of recognition, when the movement is diverted. With the advent of the video camera, and specifically the chip that is contained within it, the abstract nature of what can be created begins to take on a completely different context, both with regard to its final outcome, and the process associated with that outcome.

While the digital process is happening in a video camera, it is really also an analog form, which is why the end result can be so different. This passage, as Bellour refers to it as, is the transportation of the image from the digital to analog space. It is within that space, and through the movements that occur there, that different forms of abstraction can be achieved. "The phases of movement, of false-movement, of passage from one frame to the next, which are very sudden and punctuated with a blue flash, amount to so many outburst of distortion whose effect spreads beyond their own duration; they damage the image we discover, the resemblance that is being created to the point that we are hardly surprised at what is most surprising, and look at it twice before we watch out"

These 'outbursts of distortion' are, in fact, focused on one of the main tools of photographers over time; that which is the dynamic range of a shot being photographed. This has to do with the traditional range of what can and cannot be recorded. This includes the opacity range of captured film images, as well as the reflectance range of images on paper.

The dynamic range of sensors used in digital photography is many times less than that of the human eye and generally not as wide as that of chemical photographic media. In the domain of digital imaging, algorithms have been developed to map the image differently in shadow and in highlight in order to better distribute the lighting range across the image. When images challenge the dynamic range of what can be digitally recorded, the results are in abstractions that can occur within the image.

Video in a sense is the last analog point, or more so the place where the two worlds meet. Video is comprised of analog signals and data, but it is being created and used within a digital capture source. So within video, you have a duality that has grown over time. In a technical sense, we speak of video as having analog data, analogical signals, which is opposed to digital or numerical computer technology; in effect, it is really a meeting of the two. For Olivier Richon, this becomes a matter of reinvention, not only of the tools, but the discourse its self:

New technologies necessarily change the material production and diffusion of images, but what is of interest to me remains the question of the image. The image comes first, not the technology. The binary opposition analogical/digital is intriguing. To use the term “analogical” to define a non-digital photo is now commonly accepted, yet remains paradoxical. Before the development of the digital world of imaging, nobody used the word analogical. There was just photography. There is a reversal here, we can say that at the level of discourse, the digital has invented or reinvented the analogical. The digital needs its other, the analogical, in order to define itself. In a certain way, it follows that the analogical comes after the digital after all.

The practice of generating other-frames is based on what can be foreseen or predicted. Conceptually it is rooted in imagining what is possible based on this transition/passage, of what might be created out of this transference, and the multitudes of possibilities that rest within: “there is still the eye, there are images, quasi images, what one sees, and what one foresees... the computer image is nevertheless on the boundary of an everything-analog whose limits are obviously the creative (or should I say reproductive?) capacity of human movement and the interest that inspires it, with an outcome that is uncertain and stakes that are problematic.” The camera creates an eye of its own, which can be carried out through the actions and movements of affecting it. This uncertainty is a place of limitless possibility for experimentation.

Other-Frames are part of the greater and more profound transformations of the electronic age with regard to the changing relationship of representational imagery and abstraction. Historically the advent of photography as the medium of choice for documentation, created a space for painting in some cases to prioritize formal elements over representational content, creating a vocabulary of meaning derived from colour, shape, texture, and gesture. This space eventually culminated in the movement known as Abstract Expressionism. With the usages of the camera today, this same path is now being taken by a number of photographers and video artists who are coming across the same reactions to our current state of art and documentation.

Living in a culture where cameras have become synonymous with constant daily interactions, (whether this is the news, surveillance, online, urban screens and mobile devices) recording of memory is once again facing the challenges that happened during the shift from painting to photography. As Gil Blank correctly points out around our current state of events: “If ultimately there is anything to be learned from simulacra, it is that we can never in fact separate ourselves from the world or the real.... abstraction, whether aesthetic, mnemonic, or epistemological, is never so complete that it obviates even the

least attempt at a transparent reckoning of history, nor so corrupt that its shortcoming does not in itself offer some model for understanding the human contingency of that same history.

The camera has created a time in history where the impression of analogy has been the object of such deliberate construction, that it has been able to fundamentally question normative practices and certain techniques to the extent that such techniques become the guarantee of a capacity for analogies, the problems of which are posed by the techniques themselves. Continual techniques of the camera, in the same manner as computer software, three-dimensional rendering and other means of visual rendering, are continuing to shift, grow and emerge over time. The construction of the digital-analog space, the process which is undergone in creating this, and the abstract reality that this follows, is in line with the current movements and responses to the constant debate around what can be recorded as memory, and the multiplicity of memory currently.

WELCOME TO ARTOUT - THE FIRST ARTIST ESCORT SERVICE IN THE HISTORY OF ART!

I-Wei Li & Anton Koslov Mayr

ARTOUT furthers the ongoing inquiry into the nature of art production and its economy and test the limits of the “art scene”. Indeed, is “art” an altruistic cultural gesture, a form of business transaction, or both? Or neither?



Fig 1. Artout artist escort, available 450 euro/hr. To book www.artout.org



Fig 2. Artout artist escort, available 250 euro/hr. To book www.artout.org

L'art... peut derivier d'un sentiment genereux: le gout de la prostitution; mais il est bientôt corrompu par le gout de la propriété.

_Charles Baudelaire

ARTOUT artist escort service, launched in Paris in 2006, in many ways is a fruit of a long observation of the art scene both in Europe and in the United States. Between 2000 and 2006, Artout founder, Anton Koslov Mayr, was in charge of an educational project Engarde that investigated the political economy of art through a series of exhibits, seminars and conferences. Engarde primarily focused on the issues related to production of cultural objects and meaning, their consumption and the identity of artists, critics, curators and collectors within a larger framework of the capitalist market system in general and the art market in particular. However, the traditional academic approach upon which Engarde was based demonstrated its limitations, and by 2006 it became clear that any serious inquiry, in order to produce tangible results, demands a more radical strategy. [1]

The ideological genealogy of Artout may be traced to various sources. Mikhail Bakhtin's theory of the carnival, developed in his seminal *Rabelais and His World* is one of them. Performance art as a form of this *carnavalesque time*, in which accepted boundaries and distinctions between reality and representation are subverted (and this is why it is radically different from traditional theater) may be an example. and it explains why Artout has a large number of performance artists as participants and enters squarely into the tradition of "distubational art" to use Arthur Danto's term. [2] Artout may also be put in the

context of *institutional critique* as developed by artists like Andrea Fraser and others. Institutional critique was conceived as a form of commentary of the various cultural institutions and assumed *normalities* of art as well as disarticulation of the institution of art and its various practices. In the case of Artout, it is the relationship between the artist and his/her collector/consumer (both individual and institutional) that is being staged as a performance.

Artout has also been informed by the conceptual art inquiry into the very morphology of art. This inquiry, political in nature, questions the economic dimension of art production, namely the commodity fetish of cultural production, mystification of products and commodification of the artist's personality. At a certain stage of its development, art lost its ability to generate its own definition and, therefore, produce any significant oppositional movement outside of the existing cultural institutions. Creation of culturally significant objects have been turned into an enterprise of creating marketable "novelty"; fetishisation of novelty meant the collapse of the avant-garde since any political opposition to the existing mode of art production and distribution became impossible. In many ways, collectors had become the supreme consumers of "art", its new "aristocracy." The art market imposed total reification of the process of art production, reducing it to manufacturing of objects and events in specifically designated spaces by professionally designated people. Cultural institutions became the superstructure of the market place on which art was being bought and sold like any other merchandise, relying on an all-encompassing process of mystification. This mystification consisted of investing objects with the market value by placing them in the context of art history. Art object as a commodity fetish that offers "art historical value" became an investment vehicle and as such re-affirmed (and continue to re-affirm) a certain economic model with its history of art and its hierarchy of culture. and the entire art market and its adjacent institutional territories became a one big Bernard Madoff collection...

In other words, the law of the capitalist market with its emphasis on the ever-narrowing specialization of labor and maximization of profits invites artists to reinvent themselves over and over in order to escape the market-imposed limits to their identity. This limited identity confines artists to seek satisfying the ruling class demand for the special commodity fetish known as Art and reproduce institutionally-defined ideology of culture. Dercon, director of Tate Modern, even describes artists today as 'zombies and vampires' due to the precarious working conditions they face and endless free services they are willing to offer. [3] In both cases, the producer and the consumer of Art are limited in their freedom by the traditional modes of material exchange.

De-materialization of the art-production process led the rise of immaterial ephemeral time-based art, be it performance, sound or light installation, or simply personalized time. If legal council or P.R. manager's time may cost X \$ an hour, why shouldn't artist's time be valued just as much? The social function of an artist is as important and its cultural message is surpassing anything other economic actors are capable for. Artists are the last ones who are still capable of evoking the real sense of modern tragedy, despite or may be because of their clownesque derisive behavior. [4] And yet, our society treats them as a bunch of extravagant clowns at best, and state employees at worst.

That is why artists must defend their economic interests, their identificational integrity, they must find new organizational forms that must surpass the logic of late capitalism. Artout is an open-end project that is set to operate on the threshold between "reality" and "art" and defies the idea of a designated art space. Artout may very well be a relational project, although, we do not believe that one night-out with an artist can produce a relationship – an enterprise too utopian to be taken seriously. However, we believe that the meaning in art, just like the meaning in a language, resides neither in the artist's intention nor in what he or she does but at a point between the artist's intention and that of his or her viewer

and consumer. Our goal (and/or our product) is to create a *dialogized heteroglossia* that explores an already existing set of meanings, relations, clichés and pre-conceived ideas. By doing so we want to further the ongoing inquiry into the nature of art production and its economy and test the limits of the “art scene”. Indeed, is “art” an altruistic cultural gesture, a form of business transaction, or both? Or neither? Do we have to accept the impossibility of conversation in the same way as it was formulated a decade ago by Michel Houellebecq: “L'effritement tendanciel de la créativité dans les arts n'est ainsi qu'une autre face de l'impossibilité toute contemporaine de la conversation. Tout se passe en effet, dans la conversation courante, comme si l'expression directe d'un sentiment, d'une émotion, d'une idée était devenue impossible, parceque trop vulgaire”? [5]

To conclude, we, at ARTOUT, believe that art is an open concept and artistic praxis is the process of becoming that corresponds to the totality of individual temporality. Artistic creativity results from the dialectical relation between the acceptance of the market as the underlying principle of social reality, and the need to escape its imperatives of obedience and consensus; its locus is the individuality of the artist. The artist plays the messenger and the message, the self-medium that finds its legitimacy through the charismatic negation of conventionality.

We believe that the individuality of the artist is far more significant than the material end-product of the artist's labor. We are extending the limits of the traditional market-model to recognize the artist as the self-defined commodity whose value resides in the immateriality of artist's creative becoming. Spending time in the company of the artist is a new “creative” commodity exchange; it reveals power relations within the existing artist-patron paradigm and leads to the mutual liberation of both artists and art patrons from the condition of simple material production and accumulation to the next level of the direct creative exchange within the dominant capitalist art market paradigm.

Be it in your international head-quarters, or in privacy of your home, offer yourself a true artistic experience! To book, <http://www.artout.org>

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1. *In the first four years of its existence (2006-2010) Artout went through a formative stage. It has been denigrated and accused of being an “illicit” enterprise, snubbed, presented as a freak show, but also hailed as the most innovative art project in the period of global financial crisis (by The New York Post.) Today we are entering a new stage – that of a fully functional company, with the CEO, advisory board, deposited trademark, and representing a group of highly motivated artists.*
2. Danto, Arthur, *The Philosophical Disenfranchisement of Art* (New York: Columbia University Press, 2005).
3. H. Liebs, “Das Künstlerprekariat sitzt in der Falle,” *Monopol magazine* (2010).
4. “Le tragique intervient exactement à ce moment où le dérisoire ne parvient plus à être perçu comme fun.” Michel Houellebecq, *Rester Vivant* (Paris: Flammarion, 1997), 50.
5. *Ibid.*

NETWORK CULTURE, MEDIA ART: CULTURAL CHANGE DIALECTICS

PATRICK LICHTY

The emergence of Network Culture represents a fundamental paradigmatic shift in society. Networked connection replaces abstraction in terms of cultural production. This paper investigates the influence of Actor-Network Theory as discursive strategy that explicates public spheres such as the New Media art world creating a new form of Virtual social space.

The emergence of Network Culture represents a fundamental paradigmatic shift in society, as it resituates the concept of mediation as a default condition, in everyday life and the art world. Here, networked connection replaces abstraction in terms of cultural production. Actor Network Theory redefines the relations of all elements in a milieu in terms of their effects on the system, and not on their base significations. This results in a heterogenous semiotics of symmetry, where the material, intellectual, and social effects of agents within a network differentiates their degree of agency. This can be seen in terms of Latour's systemic "artworld", consisting of a fractal aggregate of subordinate sites, such as galleries, festivals, websites, and blogs, as well as various overlapping social spheres of influence. This paper will investigate the influence of Actor-Network Theory as discursive strategy that explicates public spheres such as the New Media art world as creating a new form of Lefebrian social space, that of the Virtual. This will be done by considering two New Media art works, *Face to Facebook* and *Wikipedia Art* as examples of cultural production that utilize virtual space as site of social agency under the ANT paradigm.

THE EMERGENCE OF ANT

It has been said that with the rise of network culture, that the shift in focus occurs from the online community to that of the "smart mob"; that this represents a decentering of concentration from the concept of located/dislocated (place-based and place-less space) to that of a flat, relational network. In *Science in Action*, [1] Bruno Latour theorizes the concept of Actor-Network Theory, in which he deals with agents in a network of relations as being *mediated, symmetric, ubiquitous, and material-semiotic*. Ubiquity is assured in that there is nothing outside the network; once someone or something engages an ANT network, it becomes an actant and therefore part of the network. Material-semiosis relates to the actant's relevance having to do not only with its signification, but also with its material circumstances. For example, someone contrasting silk versus nylon hose as social intermediaries would not deal solely with its metonymy as signifying class structure. But taking both as mediators through the material circumstances of silk versus nylon and thus constructing meaning from this as well, these objects become relevant. This is merely to say that meaning in an ANT network is a constant state of socio-cultural mediation and negotiation and is dynamically dependent on the circumstances of the whole network and its architectonic of meaning, rather than merely with its base significations. Latour also states that elements within an AN are regarded as equivalent, or described in the same terms. This includes human, non-human, and material actants, and therefore creates a 'flat' space of signification, and *does* illustrate networks of equal actants, such as flash mobs or online communities (as in our examples), rather than systems that derive difference from less complex sets of criteria.

In terms of ANT, perhaps we could conceive of the network as an heterogenous infinitude of equivalent spaces, but it may be useful for us to consider the nature of constructed space within an AN in order to

consider artworks that engage networked culture. Henri Lefebvre, in *The Production of Space*, [2] posits a unitary theory the division of space into three types, the physical, the social, and the mental. These are derived from Aristotelian “Becoming” to Kantian space to contemporary epistemology as theoretical underpinnings of his construction of space. He critiques Chomsky and Derrida is not addressing the mediation of the “the abyss between the mental space on the one side and the physical and social spheres on the other.” [3] In our case, we would like to suggest that, given the need to bridge this abyss, that we could theorize a fourth space; a Lefebvrian Virtual space as being the combination of the mental and the social. This is the space of our given artworks.

But what of the environment-net they inhabit? To construct an AN within which works like Face-2-Facebook and Wikipedia Art operate, we will look at Howard Becker’s conception of an “art world.” [4] Congruent with ANT, Becker asserts that the work of art is a system within a system which is the product of a set of a complex sociological propositions that are dependent upon one another, which we could consider as analogous to an AN. There is no homogenous “art world” per se, but heterogenous fields of spaces, milieu, individuals, and works. If we allow ourselves to extrapolate to the virtual space in our network, we can see that this expanded artworld exists as a series of overlapping and nested spaces (example, an exhibition is situated by being on a certain website or in a certain gallery, and is then contextualized by the curator and critics, and seen by the audience). There are not just overlapping spheres of museums, galleries, fairs, curators, gallerists, critics, patrons, visitors, but also social media, blogs, forums, maillists, and tweet feeds. Furthermore, our examination of artworld-as-network only denotes the mediated relevance of the milieu (spaces virtual and/or otherwise) merely as construct or our range of interest. The art world, per se, exists within the expanded fields of society, so stated not to imply it existing in social space, but art world as embedded in that larger environment. As such, we could expand the AN to encompass the globe, its societies, all objects, and their dynamic relations. For the sake of discourse, it is assured that this is beyond the scope of our inquiry, and we shall remain largely in the criteria of examining a limited art world network in a virtual space. But even so, we will see that our examples (Face2Facebook and Wikipedia Art) bleed outward from their points of origin into the larger Lefebvrian spatial landscapes.

FACE-TO-FACEBOOK

Face-to-Facebook [5] is a project by Paulo Cirio and Alessandro Ludovico that “stole 1 million Facebook profiles, filtered them with face-recognition software, and posted them on a custom-made dating website sorted by their facial expressions characteristics.” Face-to-Facebook “screen scraped” various data (name, country, groups) along with profile pictures from which a mock dating site called <http://www.lovely-faces.com/>. The artists create a virtual function of agency by harvesting the million faces (social) and processing them to create relations between them (Mental), for a critical Website for wider viewing (virtual agency). Cirio and Ludvico make explicit the theory of agency relating to the idea that facial cues are chosen and used as markers for sexual attraction, although this is a basic metric of mediated relevance in the AN. On Face-to-Facebook, the faces are analyzed using facial recognition software and grouped based on arbitrarily categories determined by the artists, “climber”, “easy going”, “funny”, “mild”, “sly” and “smug”. In Dan Jones’ essay, “The Love Delusion,” [6] states that “men typically overestimate the sexual interest conveyed by a woman’s smile or laughter”, grouping the faces creates a dialogue by implicit discourse of sexual attraction and explicit critique of privacy in social media. Cirio and Ludovico create a critical Actor Network in virtual space as critical device to explicate to make visible the cultural terrain created by social media. Furthermore, the impact of the site on larger networks is shown

by the degree of press the site has created, although this is only a visible indicator of the relational activity within this Actor Network construct.

WIKIPEDIA ART

Another project that plays with differing levels of agency in virtual space is Kildall, Stern, et al's *Wikipedia Art*. In *Wikipedia Art*, [7] Scott Kildall created a performative citation in virtual space as a combination of a mental statement (citation) in the social space of Wikipedia, creating a virtual gesture. It was placed on Wikipedia as "art composed on Wikipedia, and thus art that anyone can edit". Its header reads:

"Wikipedia Art is a conceptual art work composed on Wikipedia, and is thus art that anyone can edit. It manifests as a standard page on Wikipedia - entitled Wikipedia Art. Like all Wikipedia entries, anyone can alter this page as long as their alterations meet Wikipedia's standards of quality and verifiability. As a consequence of such collaborative and consensus-driven edits to the page, Wikipedia Art, itself, changes over time."[8]

This listing lasted for a full fifteen hours until its deletion from the Wikipedia site, but not without widespread discussion throughout communities like Rhizome.org, [9] Art Fag City, [10] The Whole9, [11] and others. The importance of Wikipedia Art was not so much the work itself but its gestural aspect as networked performance that questions the social networks of consensus.

If we could look at Wikipedia Art as an Actor Network, the project would appear as a series of subnets nested within/overlapping one another as a series of spheres of agency or influence. First, the initiators, Kildall and Stern, represent a home node in the network, with rhetorical conspirators (Sherwin, Coffelt and Lichty) representing another sphere. Socially, the project engages the Wikipedia community and the Beckerian art worlds of the Rhizome.org online community and Whole9 and Art Fag City blogs, which in turn have bled to many other venues such as the Transmediale festival and London's HTTP Gallery. Considered as a larger "art world" aggregate, this network influenced the larger society by invoking the rage of Wikipedia founder Jimmy Wales, and gaining notice of the Wall Street Journal. [12]

DENOUEMENT:

While we have explored the concept of ANT, Lefevbre's division of space, and how the two contribute to the construction of "art worlds", the emergence of networked culture creates unique modes of artistic expression. These consist of taking a metacritical role in examining virtual (mental/social) space as medium through the intervention of social media. Face-to-Facebook, Wikipedia Art, Google Will Eat Itself and others probe networks of agency to critically show the shape of networked culture. The fact that it does have a tangible effect reveals the reality of modes of agency within the network, and reveals the critical landscape of the Actor Network.

CONCLUSION:

In closing, this essay has sought to explore Latour's concept of Actor Network Theory (ANT) to describe a paradigmatic shift. That shift is from that of locative/embodyed discourse to that of purely networked

culture; that is, the shift from associating culture with places and things to purely that of symmetric networks of equivalent mediated agents. As opposed to the widely conceived hierarchical nature of the artworld, ANT conceives of "art worlds" as conglomerates of spaces, ideas, and social contracts that define milieus and works. Artworks described by ANT critique virtual milieu by engaging artworlds-as-networks, and as such explore a virtual Lefebvrian space by bridging the abyss between the Social and Mental spaces through engaging online communities. These critical pieces explore the relations between actors in social situations in context of "art worlds", with the tangibility of result of their agency being the response in the general audience or public sphere of the mass media. We can examine, using ANT, networked art such as Face-to-Facebook and Wikipedia Art, and as such, describe networked cultural production in its own terms, as demanded by ANT. The rise of networked culture has created a fundamental network shift within society, and ANT is a valuable tool in understanding the relationships created by art within networked social environments, and networked culture as it expands into the future.

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NOISE AND TRANSLATION: REMAPPING HABITUS ACROSS THE US/TURKEY BORDER

PATRICK LICHTY

Theorist Gayatri Spivak wrote of the politics of translation as being intrinsic to the construction of meaning if one looks at language as being central to that locus of meaning. Asking the question of why recurrent issues emerge is not enough, but examination of the phenomenology of dialogue between these milieux can lend insight into the experiences of who have traversed spaces which, in their own way, have been everything yet nothing.

Gayatri Spivak wrote of the politics of translation as being intrinsic to the construction of meaning if one looks at language as being central to that locus of meaning. But we can use the distance between root languages (Altaic for Turkish and Anglo-Frisian for English) as metaphor for distance between cultures, to the disjuncture of a notion of home, the translation of meaning, identity, and trans-mapping of cultural mythologies. For many artists crossing into the position of geographical otherness, the issues of translation, dislocation, and nomadism reemerge within the work. How does translation of alterity of space, time, culture and identity evidence itself through the milieu of cultural production? Asking the question of why recurrent issues emerge is not enough, but examination of the phenomenology of dialogue between these milieux can lend insight into the experiences of artists who have traversed spaces which, in their own way, have been everything yet nothing. This is not a space of universals, but a heterogeneous discursive space arising from the shock of dislocation. For our purposes, this disjuncture involves America, the fading center of the world, and Turkey part of Europe, Middle East, and Eurasia and center of Byzantium, the reemergent center of the world. In this paper, we will examine works by Turkish and Anglo-American artists who have either worked, studied, or created in the other country. In doing so, we will explore points of translation, transmapping of meaning, and concurrent cultural threads, not insofar to reduce this matrix of relationships, but to consider points of liminality expressed by the work of these artists. This simultaneous locus of commonality and dislocation becomes the expression of “others” who have themselves been influenced by that “other” place to reflect on their own hybridity and alterity.

As a brief aside, I believe that this process of cross pollination is part of a rich historical conversation over the past 150 years, starting with Osman Hamdi and the establishment of the School of Fine Arts in Istanbul. This continued with the Military Painters, A and B schools of the Early 20th century, who were in dialogue with European artists and schools[1]. More recently, the Istanbul Biennale has been a lively forum for cross cultural conversation, and some argue constitutes a key platform for the emergence of the Contemporary in Turkey. Of note are the Third "Production of Cultural Difference" [2] which expanded its scope under the leadership of Director: **Vasif Kortun** and the Eighth, under the curatorial leadership of ProspectOne curator Dan Cameron. This last instance has led to his curation of the first show at the C24 gallery, the first Gallery in Chelsea NYC that focuses on Turkish Contemporary art [3]. All these events are merely a trajectory of Turkey's interaction with Western contemporary art, and is the subject of a book in itself.

But what are key to the work of many artists working across borders are issues of transcultural translation, liminality, politics, notions of home, and mappings of mythologies, of which we will discuss translation first, which is core to the process of cross-cultural interpretation. Gayatri Spivak, in her *Politics of Translation* [4] writes of the dialectic between logic and rhetoric, where between the regular logical order of words, sentences and paragraphs lie the pauses and gaps that constitute rhetoric. The logico-rhetorical dialectic intrinsic to translation creates semilologic “frayings” that present many risks. These include violence to the subject through misreading and colonization of the other. However, Spivak also posits that the desire to translate creates other discourses. The desire to translate is borne from a love of the subject and as such, creates a space for the cohabitation of the subject and the translator. Even though the translator cannot inhabit the location of the other, the creation of a space in which the translator can attempt to identify or empathize with that other out of love for the subject. This, I propose, serves as a plausible situation for many of the artists here, and as an apologia for any mismappings I may author here.

Another notion that emerges in the work is the notion of home, its construction, habits, and the role that global nomadism plays in cultural production. In a workshop that I co-facilitated at the Cura Bodrum residency on the Bodrum Peninsula in Turkey, the consensus was that we construct the notion of home through aspects of the Heimlich by bonding home to a place, things, or people, like family or colleagues. In addition, home could be ascribed to sets of habitual practices, as suggested by Chicago-Istanbul artist Sevgi Aka.[5] However, this is challenged when individual enters Deleuzian nomadism that moves the body across space, which breaks the hegemonic discourse of boundaries such as those imposed by the nation state. This is in agreement with David Morely, in *Home territories: media, mobility and identity*[6], that describes a “geographical promiscuity” and deterritorializes the individual from practices of language and custom of their point of origin. This creates a liminal mode of being, establishing a space of alterity where one’s identity may have a starting point for its vector of flight, becomes, as Bhabha would put it, hybridized [6] – being an aggregate of experiences accumulated while in the process of motion. It has been said, “We are all aliens”, and perhaps it is the contention of the notion of home that brings this assertion into relief. We are Others when in the other country, but also return as dislocated/deterritorialized aliens as well, or at least arrive less familiar with the implication of home.

Hale Ekinci, in her *Alligator Skin Box: Memoirs of a Young Nomad* [7] playfully intersperses her nomadic dislocation of self through a series of surreal vignettes mixing her experiences in Turkey and Chicago that have existed as online media, single-channel projection, and interactive sculpture. In pre-release versions (not seen here), all her pieces are subtitled phonetically in English, but with the Turkish alphabet. Therefore, “I should do that” would be spelled with Turkish descenders for the “sh” and the like. Stories like her childhood neighbor Arzu distributing bulgur balls out her apartment window and her boyfriend being eaten by an alligator skin box on a bus take on an added disjunctive quality when subjected to the act of subtitling (reserved for foreign movies). It becomes more so when that subtitling is a transcoded/transcultural language barely accessible to either culture. Ekinci is a Deleuzian nomad who has slipped the bounds of her borders, but now inhabits both and neither. But what happens when the communication between cultures shifts to that between species?

Zeren Goktan’s *Aboveground*[8] chronicles the activities of Eastern “pigeon-raisers” who have analogues in Europe and the US, but has very ingrained traditions in the areas she studies. Within the video, the pigeon raisers exhibit great intimacy with their birds, handling them with great care, their hands resembling forms of sign language, signaling a resemblance to interspecies translation. Goktan relates that this avocation is male-centered, although she constantly searches for women engaged in the practice, to no avail. This “hobby”, as the men state, keeps them from what is considered less desirable activities,

such as frequenting coffee houses and playing cards. Furthermore, what is discovered is that this is one of the few spaces in which the men can actually openly love. *Aboveground* examines an expected space of male predominance which is also a site of intimate translation, which is interesting for its relation to its culture as well as its relation to the global nature of the practice.

Iz Oztat's *Reliquary*[9] inhabits another sacred space, that of the reliquary. The work mimics a reliquary of the Prophet in which was related to this author contained a tooth. In this case, Oztat has placed an heirloom seed in the place of the sacred tooth. Such a placement suggests the holiness of the seed in future days in light of genomics, but also calls into focus critical issues of human agency. Placed in context of the referent (an Islamic reliquary) the dialogue of the tooth with the seed calls into question a faith in the Prophet (tooth) with seed as signifier of human agency or holiness of Creation. The question that comes to mind is critical discourses about corporations such as Monsanto and the primacy of nature bring forth a complex narrative, especially when placed in the context of a farm in the Midwestern United States, which is where it was exhibited.

Chicago/Istanbul artist Sevgi Aka's *Gulf Gossip* project[10] is based on the interjection of noise into subsequent rounds of transmission and how we increasingly misunderstand one another with as stages of translation increase, like the classic "telephone game". Based on Baudrillard's *The Gulf War Did Not Happen*, mediations of the event, in this case, depictions of the Gulf War, are reiterated by successive redrawings of representations of Gulf War images. All but one of the participants are female, between the ages of 9 and 81, and the subject abstracts with successive stages, taking forms of nature scenes and increasingly generic affective responses as time progresses and entropy increases. This piece comes from Aka's frustration with global mediation of the subject, with the injection of noise into the mise en scene with successive iterations of retelling, and the commonalities and misunderstandings these communication presents, cross cultural or not. This translocation of information also plays itself out in terms of identity as well as the nomadic individual inhabits the globs and McLuhan's global village of information.

The mapping of information as identity and political representation plays a central role in Ali Mi-harbi's *Delegations*. As the visitor interacts with the piece, which consists of an LCD display and camera combination, they "see a real-time processed image of their faces, constructed using the combination of statistically extracted face features of that country's members of the parliaments." [11] *Delegations* is a representation of political representation as identity of the viewer, framing her in terms of the political landscape of the country of exhibition (Turkey, South Korea, or Mexico). This piece calls into question the fracturing of mediated identity, not only in Donna Haraway's cyborg agglomerate structure, but also the composite identity of the political individual in terms of the place the piece is viewed.

The idea of place is dealt with in N. Eden Unluata's series of books on urban excavations[12]. In this series, Unluata constructs a truly nomadic space, in this case from the artifacts of Paris or Montreal or Istanbul by enacting a series of chance operations for collage within his book-as-doorway. While in the third space (especially Paris), he engaged colleagues from Turkey and the US through Facebook as random number generators so that he could select entries from phone books, video collections, and other ephemera. The door is a liminal space that suggests passage, perhaps for him as much as the visitor-interactor as they peruse the contained videos (via iPod), images, and texts. The *Urban Excavations* are a place where he and the visitor occupy a liminal third space between places by placing all the excavations of place within the door while potentially occupying none. This also is congruent with his audio piece, *Digital Tunnel*, in which he deals with being of mixed birth, and is not "X" (insert identity here)

enough, and chooses to drill a “digital tunnel” into his countr(y/ies) of exile, and exist as a cybernetic nomad.

But when speaking about liminal discourses in transcultural art of artists who have occupied the opposite space, it is important to mention the work of Chantal Zakari and Mike Manden in their book, *The State of Ata*. [13] Manden identifies as American Jewish, while Zakari is Levantine Turk, as signified in their book project, *The Turk and the Jew*, places them at times in a minority position either in the US or Turkey. This fact gives rise to sharp irony when speaking of a famous photograph of Zakari holding a portrait of Mustafa Kemal, (also known as Atatürk, the father of the modern Turkish state) before a Islamist parade in Ankara. The result was a mass media sensation in Turkey, where Kemalist and Islamist positions sought to place the image, and Zakari and Manden with it, as everything from a heroine of the Republic to promoters of Israeli propaganda. However, at a 2011 talk at the School of the Art Institute [12], they stated that the photo was purely taken as a composition for the book *State of Ata*, and the media controversy placed them as a fulcrum between contrasting politics outside their original intentions.

The enmeshing of the political upon the space of the other is no stranger to New Media. American Andy Deck created *AntiWar404* as part of the 2010 Istanbul WebBiennial. As Deck states, *AntiWar404* “catalogs the various anti-war initiatives that have gone offline since the rise of the Web in the 1990s (with thousands of projects started in opposition to wars in Iraq, Yugoslavia, Afghanistan, and elsewhere. But these online media projects have tended to be unfunded and temporary.” [13] The site catalogues these now absent sites in an elegiac move as a global gesture towards cyber-amnesia and the elision of memory in the age of Google. Deck’s sensibility is also reflected in a 2010 interview with Alper Güngörmüşler, Deck reflects on his time as a teacher in Izmir in 2005-6 where the IT department of the university where he taught had banned articles from CNN because they contained the word “nude”. The problem is, as Deck states, that “In understanding how people reconcile themselves with limitations of their freedom and awareness, you can go a long way towards understanding culture and ideology.” This is not to say that the US does not censor certain sites, such as Wikileaks, but Deck’s discourse seeks a comparative dialogue between cultures that shows the ideological terrain of any society through the examination of the disjunctures of what is allowed to be seen and what is unseen.

Another existential disjuncture experienced by cross-cultural artists is that of cultural mythologies, that is the mythology of the other that is brought into relief through the shock of the real. In Mark Slankard’s *Toplu: Landscapes of New Turkish Suburbia*, he documents the emergence of the large-scale residencies of Toplu Konut, beginning in 2008 [14]. Many of these sites are just placed upon empty fields on the outskirts of Istanbul, either in degrees of completion or as neat high-rise condominiums. He also contrasts this with *gecekondu*, or quickly built residencies constructed without permit on public land. The contrast of these sites is stark, and differs sharply from the mythological romantic landscape of palaces, mosques and ruins of Slankard’s guidebooks.

The difference between the romanticized and the real is also illustrated in Patrick Lichty’s panoramic series, *Modern Ruins* [15] captured through composite cellphone images on the Bodrum Peninsula. The sites illustrate construction that he infiltrated during the summer of 2010 which began “on speculation” and then lie fallow when potential buyers failed to materialize the sites. These include unbuilt apartment buildings, similar to Slankard, and hillside villas. These structures merely add to the barnacle-like encrustation of white structures on the idyllic peninsula. *Modern Ruins* Lichty’s extant work with sub/urban sprawl and juxtaposes it with the idealized landscape of the Classical ruin. In the body of

work, there is also the 400 B.C. Bodrum Ampitheatre behind chain link fence contrasted against an abandoned contemporary spa, giving an abject read of the projected image of the romanticized ruin, and in part, correlating it to narratives of global millennial sprawls.

Conclusion

Upon engaging this topic, I realize that there are many more artists that could be included, and that many more dialogues could be engaged. The threads of inquiry discussed herein are only a few of a complex skein of interaction for which an entire thesis could be written. Furthermore I would like to be self-reflexive and problematize my propositions and artistic correlations as possibly being coincidental or merely results of the human condition. Ascribing commonalities to large sets of works using just the parameters of cross-cultural habitation runs the risk of conceptual colonization. However, I would like to argue that although heterogenous, I believe that there are effects of cross-habitation that have created certain discourses in these artists work, and reflect the cross-pollination between our cultures, however directly or indirectly. The cultural differences between Turkey and North America represent a degree of alterity to one another that the impact of the other and the translation of experience is a transformative one. In this essay, I have considered the issues of translation, alterity, identity, the notion of home, and mythology as touchstones on a much larger conversation of commonality and difference. Global society and recent economic and political situations events are bringing the US and Turkey closer together. As curators like Cameron and the artists in this essay explore the transcultural space between our two regions, this cultural exchange will not become only useful, but necessary. It is my hope that this exploration yields useful insights into the trans-art of the dialogue of US and Turkish cultures, and such a dialogue will grow and bear much more fruit.

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PHANTOM LIMBS: AFFECT AND IDENTIFICATION IN VIRTUAL PERFORMANCE

PATRICK LICHTY

In the concept of a “phantom limb”, an amputee relates feeling, often pain, from the absent limb. But in the era of ubiquitous mediation (the fin de millennium), embodied expression itself has become a site of contestation. What can be said for the veracity of a mode of expression when the traditionally conceived distinctive qualities of that medium are removed? What happens to embodied art when the body is removed?

In the concept of a “phantom limb”, an amputee relates feeling, often pain, from the absent limb. The process of amputation delineates the borderline of presence, the liminality of separation, the phantom effect the feeling for that lost presence. Performance art inscribes space with presence, with flesh, bone, and sinew; wasn't it supposed to be a final authentic site of immediacy and authenticity in art following the dematerialization of the object in contemporary art after Formalism in the 1960's? But in the era of ubiquitous mediation (the fin de millennium), embodied expression itself has become a site of contestation. The body had become the repository for direct expression in art with the coming of Performance Art. With the recontextualization of seminal works by Marina Abramovic with her *Seven Easy Pieces* [1] the meanings of the works as immediate, site-specific happenings became circumspect. This was further compounded by artists Eva and Franco Mattes, self-proclaimed “haters” of Performance Art, who remediated other seminal works, including those of Abramovic in the online virtual world Second Life. What can be said for the veracity of a mode of expression when the traditionally conceived distinctive qualities of that medium are removed? What happens to embodied art when the body is removed?

Virtual performance art should not function, but it does. The process of draining the site of performance through decontextualization then disembodiment should have destroyed the event of meaning. Where there was blood, there are now only pixels. Where there was presence, there is only the feel of a mouse in the hand. When the avatar shoots the other with a gun, we still flinch. What are the qualities left that connect us to the when avatar when we sever the flesh from embodied performance? I posit that there are three aspects to performance that remain after the virtualization/removal of the body in the creation of virtual performance. These are affect, desire, and mirroring/identification in relation to the avatar. These correspond to the prepersonal, productive and neurological identifications with the proxy. This presentation will explore a phenomenology of affect, desire and identification in the virtual and discuss the importance of these qualities as intrinsic criteria of synthetic performance.

1: Affect

Brian Massumi, in *Parables for the virtual: movement, affect, sensation* speaks extensively on the autonomy of affect. “Affect is the virtual as point of view” [2 Massumi, 35], he says, relating to his assertion that the virtual begins with the event that is too immediate to be perceived, and thus elicits that event's autonomy from the body. What is happening in the site of virtual performance is the precognitive conversation of “the simultaneous participation of the virtual in the actual and the actual in the virtual, as one arises from and returns to the other.” The virtual as site of immediacy begins in the moment of the imperceptible, opening the synesthetic space of autonomy (from the body) while retaining the intensity of the moment. Affect implies, “a participation of the senses in each other: the measure of a living

thing's potential interactions is its ability to transform the effects of one sensory mode into those of another." Can we say that this potentiality is the precursor to emotion, to identify with the potential of a living thing's interaction with a *mise en scene* (through an avatar?) One axis of virtual performance's efficacy is the disconnection of affect from the body as eliciting of synesthetic effect, suggestion that affect may have more to do with action and intensity, perhaps evoking desire, which brings us to Deleuze.

2: Desire

Second Life is an online 3D multi user virtual environment, or MUVE, that owes its existence to the aggregate contributions of tens of thousands of online participants, who construct the buildings, socialize and perform in virtual space. In *Anti-Oedipus*, Deleuze and Guattari posit that desire is not to be linked with the gaze, or signification, but with production in the social field. The avatar represents, by its very existence, an evident desiring-machine that, through its production of virtual capital in the form of artifacts, buildings, codes, and interactions, manifests reality through the consummation of desire via material and social expression. As affect and its translation into the virtual is opened by the preperceptive moment, it is the unconscious and the libido that are the engine of desire. But in their text, their deconstruction of desire signals the aggregate Body without Organs that assemblages of desiring machines, which then represent, "the nonhuman sex, the molecular machinic elements, their arrangements and their syntheses, without which there would be neither a human sex specifically determined in the large aggregates, not a human **sexuality** capable of investing these aggregates" [3 *Anti-Oedipus*, p. 294] It is this nonhuman sexuality of the desiring-machine, the Krokerian "sex without secretions"[4] that then creates an effusive concrete production in the virtual. From this, we can say that the production of the aggregate world of Second Life is a desiring-production in the virtual socius that is product of the deanthropomorphized libido. As such, it begins with the birth of the avatar, manifests in the production of the virtual world, and is consummated in the performative gesture of everything from the cocktail party to execution of code to virtual (machinic) sex. Therefore performance art in Second Life could be said to be the production-manifestation of desire made manifest in the virtual. And to playfully quote the Arthur and Marilouise Kroker, "How could be otherwise?" It appears that the desires of the machinic mirror the body to some extent and this is the next subject of our discussion.

3: The Mirror Cortex

We have discussed the issues of the affective and desire, but I would like to return to idea of the phantom limb metaphor and the identification with identification with the avatar. As there are times when a person with phantom limb disorder can be soothed through seeing a limb be massaged, there are theories that humans empathize with human-like forms through neurological empathy, Neuroscientist VS Ramachandran has popularized neurobiological research of the existence of "Gandhi Neurons"[5] or what he calls the mirror cortex. These neurons are thought to be the basis of many aspects of human existence, such as empathy, learning, and culture. Mirror neurons fire in sympathy with the observation of another person's action. One thing that is ironic that Ramachandran uses the metaphor of watching a virtual reality simulation of the other person's actions, and this brief aside is the opening for our discussion. To put forth the idea that we identify, empathize and project action or touch through the engagement of the mirror neurons, and the idea that we simulate action and touch through projection through perception is very important. To do so explains empathy for the other in a performance space, but in our case, the projection of the self upon proxies such as dolls or avatars. Where this is shocking is when we consider Ramachandran's example of soothing phantom limb pain by massaging another's limb by proxy. What I propose is that neural identification through the mirror neurons is a fundamental cognitive act mitigates performance, and also translates to proxies and poppets. For the next section of this essay, we will look at examples of virtual performance that will attempt to illustrate aspects of affect, desire, and mirroring.

Sites of Engagement: Affect

Saveme OH [6] is a Dutch virtual artist who works in invective and narcissistic grandeur reminiscent of the New Media artist formerly known as NN, who often dominated listserv traffic on lists like Nettime and 7-11[7]. Her art, as mentioned before, consists largely of narcissistic excess through the colonization of the space around her, whether it involves declaring herself “President” of Second Life or imposing herself verbally or visually into situations, often getting her banned. In reaction to bans, Saveme’s reaction is frequently to stage an outcry about censorship. Her strategy is a cross between “trolling” (disruptive aggravation) and tactical intervention, but her tactics inflame an immediate affective response. This is due to the fact that Saveme’s visual appearance often dominates an entire screen through use of huge “worn” devices that create an optical disruption that open the door for her virtual psychodrama. What is most important here is that her domination of a milieu creates a synesthetic disjuncture where there can be no other focus than her gesture and the potentiality of action, engaging affective reaction (albeit frequently negative).

Another group of artists that have elicited an affective immediacy in virtual spaces is that of the performance group Second Front. Founded in 2006, Second Front are a dispersed set of individuals ranging from San Francisco to London who engage in NeoDadaist/Fluxus-based interventions in Second Life. For a piece entitled “Wall-ker Art Center”[8] (or *Dancing About Architecture*), Second Front appeared with huge cement walls, disrupting the visual field, where they engaged animations to gyrate the structures erratically in space, creating an architectural performance. The result was a disorientation for many on-lookers, as the ephemeral walls swung around, appearing to hit the avatars, but passing through them. An anecdotal report during the performance related that the experience was jarring to the point where they had to “teleport” out of the space because of the visceral reaction, reifying Massumi’s assertion of translation of sensation in the affective. Both studies depend on the virtual as point of view and utilize the immediacy of the visual to create effects that translate into the visceral. This bodiless visceral reaction brings us to the site of desire.

Sites of Engagement: Desire

It could be said that using the Deleuzian model of desire, manifestation of being in Second Life is self-sufficient for the description of efficacy of the avataric desiring machine as engine of production or signifier of the libido. To expand from Deleuze, desiring-production is not making love to become one, or two, but thousands. The fecundity of the Body Without Organs, literally or semiologically, is to unchain the repressed libido in revolutionary fashions that the flesh can never attain. This unfettering of the Freudian unconscious takes place in two pieces, Eva and Franco Mattes’ *I Can’t Find Myself Either*[9], and various incarnations of avatar Vaneesa Blaylock’s installations. In the first of these two, as part of their *Synthetic Performances* they suggest that the infinite gesture of becoming is to stay at home and play video games, like Second Life. In this piece, a bed with embedded sexual animations for is activated in the performance space. Eva and Franco’s avatars gyrate on the bed, and soon other avatars join in the cyber-orgy. Soon the bed is packed, and the avataric bodies obscure one another to the point where the piece’s name comes into play. No one can find themselves, but there they are. And, the gesture of the Body Without Organs on screen belie that the avatar is no one and yet everyone, the production of a null body implies the birth of all possible bodies in the virtual.

Another artist who explores the multiplicity of production in virtual space is that of Vaneesa Blaylock, whose name closely mimics that of performance installation artist Vaneesa Beecroft. Her motto is that she is an individual, and so is she, suggesting a self-reflexive stance about her multiplicity. Much like Beecroft’s installations of nude bodies in gallery spaces, Blaylock stages arrays of nude avatars in space under some sort of framing mechanism. Various pieces[10] explore general topics of identity and

cloning, the average parameters of avatars in Second Life, “the girl next door”, and replication of form as production of desire. In each installation, Blaylock arranges the avatars as manifest desiring machines in the unfettered frame of the virtual, inferring that her production is but a sample of infinite permutations and endless emanation. The nude avatar, as signifier of basic sexual desire is here emptied and used as a proxy, a placeholder for our own projections of desire, but since they have been machinized and dehumanized, they stand for an infinite space of nullified machinic desire, and infinite fecund potential, potential being essential for affect. Vaneesa’s installations also engage the doppelganging the body in configurations like Beecroft’s, which takes us to the idea of Mirroring.

Sites of Engagement: Mirror

Macarthur Foundation Director of Connie Yowell said at the 2007 Second Life Community Conference that the first move into the virtual is recreation of the real, called orienteering. Performance artists like Scott Kildall, and again, Eva and Franco Mattes have done “remediations”, or restaging of classic performance art pieces. In Kildall’s *Paradise Ahead* series of recreations[10] include Chris Burden’s Shoot, in which he allowed himself to be shot in the arm in the gallery, or Yoko Ono’s *Cut Piece*, in which she allowed her dress to be cut away a piece at a time. But these are not merely recreations, but empathic mirrors of the gallery, as Ramachandran might argue that we will still feel as Kildall’s avatar fires the virtual rifle, there is a still a flinch when the other avatar is hit. This is not mere signification, if neurological mirroring applies to proxies of the body, then our feeling for the virtual phantom limb of the avatar is real.

The eponymously named AM Radio recreates pathos in the recreation of a trompe l’oeil of David’s Death of Marat[11]. The original, which depicts the radical French journalist Jean Paul Marat dead in his bath after being murdered by Charlotte Corday is recreated sans the body of Marat, upon which the visitor clicks upon the bath, and their avatar fills that position. Therefore the projection through the avatar is further extended into the David painting, specifically into the position of Marat. Here the interactor becomes the subject of, as Baudelaire mentioned, David’s “drama... vivid in its pitiful horror”. This scene’s abjection and the user’s requirement is not isolated; its requirement to participate affectively projects the self into that horror and peace concisely.

Site of Engagement: Affect/Desire/Mirror

Although we have examined sites of engagement that have dealt with the unfolding of Massumian affect into the profusion of virtual desire to the projective identification of the mirror, there are many virtual works that address any and or all of these modes of engagement. Micha Cardenas and Elle Mehrand’s *Technesexual*[12] performance engage all three loci of this discussion. *Technesexual* involves the two engaging in erotic acts in a physical space while equipped with biometric sensors. The output from these sensors is fed into Second Life through an interface using the programming language Pure Data, which is reflected in actions by their avatars in Second Life, which are projected in the performance space. As Cardenas and Mehrand play on stage, they engage the immediacy of the body and the affective lag of translation into Second Life, virtualizing their acts. Their unleashing of the libido into the machinic body creates a manifestation of desire-production in the virtual through gesture and translation of the physical into the virtual and the transmission of that experience to the online participants. And lastly, their doubled bodies, both in world and in the performance spaces powerfully create the projective connection between the two, and the connection of virtual space. Perhaps the introduction of live bodies into the milieu either negates or amplifies the argument for performance in the virtual, but from this author’s perspective, *Technesexual* appears to consummate (metaphorically and literally), affect, desire, and projective identification, and is the pinnacle of the elements of our conversation.

Denouement

In this essay, I have sought to construct an argument for the understanding of affective engagement in the genre of virtual performance through the thought of Massumi, Deleuze & Guattari and Ramachandran as played out through the work of many artists. This is not to say that there not other artists who also fit this discussion, like Joseph DeLappe's Gandhi project[13] and Stephanie Rothenberg's work in virtual labor[14] and Elif Ayiter, Selavy Oh, and Max Moswitzer's collaborations in virtual textuality with Roy Ascott[15]. The choice of works in this essay are merely a brief archipelago designed to create an epistemic arc to explore the visceral connection to the virtual. There are far more examples to me touched on, and this presentation is designed as the opening note of an ongoing conversation regarding virtual performance.

Conclusion:

By all rights, we should not care about virtual performance as performance art is intrinsically tied to the body as last bastion of creative authenticity. Upon severance of the flesh from the performative gesture, it would make sense that our affective relation for the virtual body should cease. But our phenomenology of virtual performance through affect, desire, and projection suggests otherwise; virtual action creates real responses. In this text, I have sought to explore the role of affect, desire and mirroring-identification with the avatar as evident site of engagement. Although the case for virtual performance's connection to the flesh through our desires, projections, and empathies, it is easy to hold these forms circumspect. Is virtual performance new enough that it constitutes a nostalgia for the flesh, and echoes of the body as phantom limb, or merely grown up poppet play? One could argue that this genre is a fetish for performative dollplay, but regardless, virtual performance contains a combination of echoes of the real and real affective response. This is seen from phenomenology to prepersonal cognition to neurology. Our affect for the avatar exists, and it appears to be acculturated and hardwired into our beings. But as genres such as MMO's and virtual environments like Second Life continue to mature, it will be curious as to whether virtual performance will be a momentary affectation or an emergent genre that merely reflects the virtual as a primary mode of human existence.

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ENVELLA: MAKING SPACE PERSONAL

Henry Lin

The paper describes enVella, a kinetic dress that moves when triggered by the detection of the wearer's fear or anxiety. The aim of this project was to investigate the detection of fear with biosensors, and to see whether an enveloping physical transformation can provide a sense of comfort to the wearer.



enVella open and close comparison, 2010, Mark Coleman, Emily Ip, Henry Lin, Alice Ling, Laurence Man, photographic media, Copyright 2010 Henry Lin.

INTRODUCTION

enVella is a kinetic dress which moves when triggered by the detection of the wearer's fear or anxiety. The upper portion of the dress is encircled with fans, which open and envelop the wearer if her body temperature and heart rate are both rising. The aim of this project was to investigate the detection of fear with biosensors, and to see whether an enveloping physical transformation can provide a sense of comfort to the wearer. The paper will begin with the inspiration behind enVella, discuss its design, and conclude with the technical aspects of the project.

INSPIRATION

enVella draws inspiration from the natural world specifically with regards to animals' reactions to fear and the idea of engendering feelings of safety in human beings. An experience everyone has in common is that of being in a mother's womb. In a warm, enveloped space, one feels safe, warm and protected as if one was inside the mother's womb. [3] Despite not offering any real protection, we instinctively huddle under a blanket when frightened.

enVella's motion was inspired by the frill-necked lizard which is capable of erecting a normally-concealed frill from around its neck. This physical transformation makes the lizard appear larger than it is, and so a less appealing prey. [4] By merging this reptilian defense mechanism and the soothing of envelopment, the hope was that this combination would produce a comforting psychological reaction in the wearer during anxious moments.

DESIGN

In an attempt to recreate the sensation of being enveloped inside the mother's womb and implementing the frilled-neck lizard's self-defense behaviour of increasing in size towards wearable technology, this adventurous application explores the concept of embodiment where the dress and wearer engages in a symbiotic relationship. In order for enVella to achieve its full potential, the dress must be worn for it to react accordingly with the wearer's emotional state. Without a pulse, the dress cannot achieve its full potential and without the dress, the wearer will not be able to experience the safety, comfort and protection provided by enVella.

enVella is designed on a white cotton dress attached with four servo-controlled fans. Each fan is constructed of satin fabric folded in half multiple times, and held in place by heavy duty double-sided fusible interfacing. Wooden supports were added onto the ends of each fan to provide motor and anchor support. At the base of each fan, a servo attachment was glued. The fans are triggered by a combination of the two sensor inputs: a heart rate monitor and a temperature sensor. If the wearer's current heart rate and temperature is greater than a predefined average heart rate and body temperature, the fans will open – beginning at the chest then around the neck in a sequential manner (Fig 1). With the fans in their opened form, heart rate and temperature data continue to be relayed from the sensors to the microcontroller. If both heart rate and temperature return to normal after 20 seconds, the fans will close.

The core element of enVella was inspired by animals with distinctive self defense reactions such as the frilled-neck lizard. Through user studies, few design forms were determined as most effective at enveloping the wearer and embodying the idea of comfort and warmth. The four fans were strategically placed and programmed to optimize the enveloping experience. When a state of anxiety or fear is detected by the microcontroller, the fans will open in smooth succession. Because enVella is a dress designed to comfort the wearer, the decision to have the fans open was to create a sense of division between the wearer and the frightening, threatening entity. This invisible wall creates a psychological barrier between the two and thus alleviating some of the resultant fear. A gradual enclosure of the space around the wearer's visual field, rather than a sudden one, adds to the comforting quality of the motion. Whereas if the fans were to open rapidly, it would have an opposite effect on our intention of comforting the wearer.

TECHNICAL

Among the technical challenges present in enVella, detecting and identifying fear was the most difficult to justify through biosensors. One challenge was to find a suitable solution to distinguish fear from other strong emotions like anxiety and anger. Fear is generally differentiated from anxiety by the perception of a specific external threat. However, for our purposes, it was not possible to distinguish one from the other as anxiety and fear have almost identical physiological symptoms. Typical physiological responses to fear and anxiety elevated heart rate, increased sweating, and increased blood pressure. Both the input of heart rate and body temperature were chosen for the purpose of this project, as an indication to measure state of fear. Various heart rate monitor circuits have been developed with Arduino using different methods but the majority of implementations use the Polar RMCM01 Heart Rate module. The Polar Heart Rate Monitor Interface (HRMI) was selected given the added difficulty of working with the bare module. The multiple interfaces available in this new module make it very stable, flexible and easy to work with.

CONCLUSION

enVella project designers witness the success of the dress and how it achieves envelopment through the natural motion of fans. User feedbacks have been positive, with the majority stating they found the enveloping effect comforting. A few participants raised possible issues with the feasibility of a cloth dress offering sufficient protection, and concerns over providing comfort without actual protection. Participants also mentioned possible discomfort and unease that may arise from users who are claustrophobic. Through academic research, the team on designs inspired by nature and explored various forms before finalizing on fans to create temporary personal space. enVella is not only a dress but is also a concept to assess the research question of creating personal space in a state of fear.

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CREATIVE ZEN LEARNING SPACE AND COMMUNITY

JIUN-SHIAN LIN, CHI-HUNG TSAI, SU-CHU HSU, CHIA-WEN CHEN & YU-HSIUNG HUANG

We describe a creative Zen learning space built on interactive technology, digital art, and installation art, including three parts “zen_Sit,” “zen_Move,” and “zen_Circle.” It allows any place, any time, ubiquitous Zen – with mindfulness and meditation exercises for concentration, sitting meditation, and walking meditation. It supports the beginning of a digitally-enhanced Zen community.

PREVIOUS WORK

As mentioned above, interactive multimedia technology has been used widely in a variety of artistic, educational, entertainment, and industrial applications. (Space limitations prevent us from giving a full survey.) Particularly important for developing our work have been the technologies of chat rooms, smart phones, and wireless sensor networks.

- Chat rooms: Our creative interactive meditation space uses chat rooms as a simple solution to scalability and mobility issues in zen_Move. Chat rooms are fairly widespread across the Internet and serve a broad range of entertainment and information dispersal applications. Some exemplary application fields are defense; [1] entertainment; [2] and educational study assistance. [3] Below, we show how we used chat room technology to create a communication mechanism across a sequence of computers in the zen_Move meditation environment.
- Smart phone remote control: Our creative interactive meditation space uses smart phones as both remote control devices and to present interfaces supporting “meditation anytime and anywhere” in zen_Move. Control applications using cellular telephones have become widespread, through ad hoc Bluetooth networking, [4] and as remote controls for a variety of appliances. [5]
- Wireless sensor networks: Wireless sensor networks (WSNs) have been widely deployed in a variety of applications including national defense, health care, environmental monitoring, industrial control, etc., [6,7] but only rarely have found use in fine arts. A major exception is Intelligent Interactive Museum [8] which used ZigBee wireless sensor networks, interactive technology, and content management systems to create a museum environment which dynamically adjusted content according to participants’ gender and age. We used WSN technology in zen_Circle and zen_Sit.

Two notable applications of multimedia technology to support meditation are:

- The 2003 installation *ZENetic* Computer created by Japanese researchers Naoko Tosa and Seigow Matsukam. *ZENetic* Computer transformed traditional meditation content into multimedia to teach meditation practices and guide participants to feel and learn meditation through computer systems. [9]
- *AltarNation* created by US artists Michelle Hlubinka and Jennifer Beaudin in the wake of the 9/11 terrorist attacks. The community created a multimedia prayer room in each member’s home and networked them together. Members could share thoughts and emotions with other remote members and console each other by lighting memorial candles, praying, etc. [10]

In contrast to the above systems, our environments teach mindfulness exercises via interactive meditation environments with a focus on walking meditation; with the ultimate goal of helping participants approach the ideal of treating every moment as a meditative moment.

ZEN_MOVE

zen_Move is an interactive installation environment installed along a corridor at DDBC that allows participants to use ten touch-screen computers to engage in a mindfulness exercise. As Fig. 1 shows, zen_Move is public installation deployed in a linear design with visual effect. As participants move from screen to screen to follow the exercise, they are encouraged to pause and practice mindfulness exercises.

SYSTEM AND INTERACTION SCENARIO

zen_Move uses a long wooden box embedded with ten touch screen computers, wireless network cards and a cover permitting ventilation and access for maintenance. Using a chat room as a tool to support scalability and mobility, we have built a smart-phone version of the application that can be exercised in any location, but further, it remotely triggers the installation.

Participants attempt to move a “Zen ball” (the red dot) along the basic line showed in Fig. 2. The Zen ball is surrounded by a traditional calligraphic Zen symbol representing emptiness – a circle which is the touch sensing area. The participant interacts with the Zen ball using a finger. This involves a careful exercise in which the participant must guide the Zen ball with a finger along a base line at a uniform rate without deviating from the line. After extensive experimentation, we set a time limit for movement on a single screen at 25 seconds. We calculate a focus index (using a function determined by statistical analysis and experimentation) from the horizontal movement along the baseline and any vertical offset from the baseline. The focus index shows how smoothly and accurately the participants manipulate the Zen ball. Depending on the focus index the participant can move the Zen ball (red dot), the dot will “jump” to one or more screens.

- The basic mode involves dragging the Zen ball (red dot) along the base line within 25 seconds. The focus index is calculated and the ball is advanced to another screen based on that focus index. The exercises ends when the participant reaches the tenth screen; when this happens, a traditional low Buddhist chime sound is generated, acting as a reminder to the participant and to all in the area about mindfulness. Because posture, smooth movement, and careful attention are required to succeed in the basic mode of zen_Move, participants find that it heightens mindfulness.
- The mobile mode extends the basic mode so that a participant can practice the mindfulness exercise anywhere using a smart phone. The smart phone acts as a remote control displaying a single screen of the full installation at DDBC (which reacts in real-time) to the exercises being driven by the remote user. As observers see the Zen ball moving without any participant at the installation, they can infer that someone is performing the mindfulness exercise remotely. Fig. 3 shows a participant using the mobile mode.

ZEN_CIRCLE

zen_Circle is an interactive installation environment that uses wireless sensor networks to help guide participants as they engage in various types of walking meditation exercises on a large outdoor mandala fashioned in the shape of two embedded spirals. Fig. 4 shows this zen_Circle; the installation environment plays natural sounds and brahma music to give feedback to participants as they engage in walking

meditation. zen_Circle encourages participants to take time to walk and to integrate meditative practices actively in their everyday movements. zen_Circle is public art deployed in a circle shape design with audio feedback to guide participants.

zen_Circle permits several types of meditation known as walking meditation, and uses wireless sensor network technology to support interactive feedback. The zen_Circle interactive installation environment encourages participants to take time to walk and think (or meditate) in face of a busy life. We believe that this practice will encourage people to adjust the pace of their life, to relax in movement, and experience the benefits of this form of dynamic Zen.

WALKING MEDITATION

To understand zen_Circle, it is helpful to have a little background on walking meditation. While sitting meditation is perhaps the most respected form of Zen meditation, ordinary circumstances often make it difficult; and walking meditation is an alternative. The theory behind this type of meditation is that movement can help stimulate insights and a meditative state.

Two types of walking meditation are supported by zen_Circle. One type is *jingxing*. This type of meditation uses slow walking with specific posture suggestions.

A second type of walking meditation is *paoxiang* – this is a composite form of meditation that includes *jingxing*. Paoxiang, which literally means “walking incense,” is a group exercise – several monks, nuns, or lay people will walk in carefully coordinated sequence. Each participant must pay close attention to his or her movements at all times to avoid running into the person ahead, or creating a barrier for the person behind. Walking is divided into different phases – a slow walking phase (*jingxing*), a fast walking phase, and pausing phase. In classical technique, a meditation master guides the group by shouting out the different phases; in zen_Circle, signaling is given using sounds played on wireless sensor nodes attached to speakers.

SYSTEM AND INTERACTION SCENARIO

zen_Circle uses a double spiral laid out in the fashion of a large mandala (a traditional meditation tool associated with several forms of Buddhism and other Eastern religions) with five sensor nodes as shown in Fig. 4. In Buddhist thought, a mandala shows the cosmology of time and space. The zen_Circle interactive installation environment supports two modes. A simple switch in the control node shifts between basic *jingxing* and advanced *paoxiang* modes in the control node.

- *Jingxing* is the basic mode and supports a single participant. As the client sensor nodes detect that a participant is passing, they play sounds. The first sensor plays bird song, corresponding to the Buddhist “air” element. The second sensor plays the rustling sound of dry leaves, corresponding to the Buddhist “earth” element. The fourth sensor plays insect sounds, corresponding to the Buddhist “fire” element. The fifth sensor plays the sound of rushing water, corresponding to the Buddhist “water” element. The third sensor node has a special role, corresponding to the Buddhist “emptiness” element. The participant is directed to pause and meditate when he or she reaches the center. If the participant’s meditation lasts longer than ten seconds, all the nodes receive a signal from the control node, and all the nodes play synchronized brahma music for as long as the participant remains at the center of the installation.

Paoxiang is an advanced mode for participants who have extensive walking meditation experience. This mode is designed for multiple participants, who walk in synchronized fashion, focusing their mindfulness on their movements. To achieve synchronized movement (and avoid collisions) careful attention is required. In this mode, the first, second, fourth, and fifth nodes each play natural sounds for ten seconds when they are activated – if they are reactivated while the sound is playing they continue playing and reset their clocks to zero as they count to ten seconds. The characteristic *paoxiang* movements (rapid walking, *jingxing* slow walking, and pausing) are controlled by the third node, which generates the different control sounds randomly for random durations.

Paoxiang meditation in general, and particularly *paoxiang* in zen_Circle, teaches a form of unity of thought, since the actions of each participant reflect on the ability of the group to successfully complete the meditation exercise.

ZEN_SIT

zen_Sit is an interactive installation environment built inside a room that includes extensive wireless sensor technology to monitor posture of participants through pressure sensors embedded in the meditation cushions used by the participants in sitting meditation. Fig. 5 shows zen_Sit. Information recorded by zen_Sit is displayed in a ceiling display that shows meditators with stable, even posture using a large circular rippling wave. The Zen master leading a sitting meditation session can thus immediately diagnose any meditators who lack good posture. All the status data are stored in sitting meditation database. Alternatively, the information can later be used to analyze various states in long meditation sessions.

SYSTEM AND INTERACTION SCENARIO

We use several pressure sensors embedded in the meditation cushion. We also integrated low-power wireless technology (Zigbee) to transmit pressure values from the cushion to the coordinator (a personal computer), forming a wireless sensor network. The coordinator processes input data from Zen meditation cushion and performs real-time statistical analysis on it to calculate a mindfulness index. The mindfulness index is visualized as a ripple flash animation projected on the ceiling. A more active ripple indicates a meditator for whom the pressure sensors indicate a deeper or more effective state of meditation. This allows the Zen master to easily monitor the status of the individual meditator participants. We also develop a database for zen_Sit to record each participant's Zen meditation level showed in Fig. 6. Through the interface of the Zen database, both teacher and participant can check the participant's practice history and meditation levels.

ZEN COMMUNITY

In addition to these interactive installation environments, we are currently building several others. There are more and more people immersed in our creative Zen learning space. The system gradually and naturally forms a meditation community. We have used our systems to collect a wide variety of data through our existing installations. Researchers at DDBC are interested in the possibility of collecting and using data to investigate physiological and behavioral aspects of meditation practices. While previous studies have been dealt with sitting meditation practices, less data is available for dynamic meditation, such as walking meditation. Since our data is collected by sensors in a natural fashion, in the course of

the ordinary operation of our interactive installation environments, it could be especially useful for study.

Zen is not a mystical religious activity but an efficient method of improving human physical and mental health. People can do Zen exercises easily in their daily life. Be inspired by the idea of carbon footprint from environmentalism, we propose the concept of “Zen footprint”: an index which describes the amount of Zen exercise to maintain peaceful minds. People who have a higher Zen footprint index are likely to have more peaceful minds. In *zen_Move* we will add up the total number of steps to calculate the Zen footprint. Similarly, in *jinxing* mode in *zen_Circle* we add up the total number of minutes that participants pause and think in the central node; in *paoxiang* mode, we collect the total number of the circles of the participants walking in the mode; in *zen_Sit*, we collect the total number of minutes that participants sitting with meditation practice.

In the future, we will integrate the smart phone system, the interactive installations and Google Map to build a Zen map to show the footprint in different places. Zen maps will offer real-time feedback that adds a geographic dimension to web e-learning systems.

CONCLUSION

This paper makes a number of novel contributions:

- It describes our creative interactive meditation space which is also an intelligent, invisible, informative and interactive space.
- It uses technology to motivate participants to engage in “ubiquitous Zen” where people can engage in walking meditation at any time in a wide variety of circumstances.
- It presents the conceptual design of these interactive installation environments, together with a discussion of how interactive multimedia can (somewhat paradoxically) engage participants in meditative and mindfulness practices.
- It includes a discussion of the actual building of these interactive installation environments. These environments are not merely conceptual designs or prototypes, but real, working systems that are actively used every day.
- It includes a discussion of the real-world engineering issues faced in supporting mobility and scalability in these interactive installation environments.

In contrast to many interactive multimedia systems, we have found that the environments comprising our creative interactive meditation space actually decrease distraction and help their participants relax and make achievements in mindfulness and relaxation. The installations also act to help suggest to participants that Zen practice is available at any time, any place. The *zen_Move* interactive installation environment is always available for one to pause and engage in a mindfulness exercise even through the smart phone interface. The *zen_Circle* interactive installation environment acts as a reminder that meditation can be integrated with one’s movements – even as part of one’s daily walks. The *zen_Sit* environment provides real-time feedback for sitting meditation allowing a Zen master to more effectively guide the meditator participants. We also hope to realize the concept of Ubiquitous Zen in a variety of cultural contexts and to support mind-brain cultivation.

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EMBODIED SCHEMAS FOR CROSS-MODAL MAPPING IN THE DESIGN OF GESTURAL CONTROLLERS

Mark Linnane, Linda Doyle & Dermot Furlong

A conceptual framework for the design of intuitive gestural controllers for timbre manipulation from an Embodied Cognition perspective is proposed. This framework incorporates corporeal mimesis, affective/kinaesthetic dynamics, image schematic and conceptual metaphoric organization in order to speculate on possibilities in the design of mapping schemes between interface and synthesis algorithm.

Introduction

In contrast to traditional musical instruments, digital interfaces introduce an “arbitrary” component by encoding physical gesture as an electronic signal. This arbitrary component interrupts the natural, ‘felt’ sense of the interaction between performer and instrument and necessitates the introduction of control metaphors and mapping schemes that are not necessarily readily intelligible for non-technical users.

This paper focuses on the design of interfaces for the control of synthesized timbre. Several mapping strategies for control of synthesis have been proposed. However, it has been noted that empirical investigation of the “natural tendencies for multimodal mapping” is required in order to elaborate a generalizable set of cross-modal mappings. [1] We propose that the design of transparent, intuitive interfaces for timbre manipulation can be grounded in empirical analysis and subsequent artistic practice-based research focussed on cross-modal correlations between the user's embodied experience and a timbral perceptual domain. Gestural control is suggested as an appropriate paradigm in this context because it offers the possibility of affording intuitive control of sound via an intermediate ‘embodied’ mapping scheme based on ‘embodied’ characterizations of timbre and gesture.

Embodied Cognition offers a promising conceptual basis for this research. We suggest that structures common to cognition, multimodal perception and physical gesture can be identified. These correlations may then form the basis of a generalizable set of cross-modal mappings to be incorporated in the design of a gestural controller for timbral manipulation. This paper is a speculative outline of some possibilities for the application of embodied cognition in the design of gestural controllers for timbre manipulation.

Embodied Cognition

BACKGROUND

Embodied Cognition is an emerging research strand in a number of different disciplines that posits embodiment as profoundly constitutive of cognition. In general, Embodied Cognition analyses support the view of cognitive processes as creative, figurative acts structured by the teleological interactions of embodied agents with their environments and cultures rather than as largely passive processes of repre-

sentation and calculation. [2] A central claim of Embodied Cognition is that cognition and action are inextricably linked in lived experience. [3] Significantly, studies suggest that the specific structures of an organisms perceptual apparatus contribute to a structuring of all cognitive processes, not just those specifically recruited in perception.

Embodied Cognition analyses reveal a number of common primal structures and processes in cognition. These are learned via the common human experience of having a physical body and interacting in physical and cultural environments. Affective/kinaesthetic dynamics, Sensorimotor Mimesis, Image Schemata and Conceptual Blending have been identified for empirical analysis in this study. Essentially, the research question here is, for example, are Image Schemata activated by judgments of timbral quality and by gesture production and recognition? Can such schema be reliably demonstrated empirically? If so, what correlations exist, if any, between schema activated by timbre and those activated by gesture?

IMAGE SCHEMATA

Image schemata are basic features in cognitive processing acquired in early childhood development. They are based on basic dynamic embodied patterns and they give structure to more abstract conceptual processes. They are non-propositional, pre-conceptual structures that have a role in organising mental representations into coherent, meaningful units. They have a basic logic and are implicated in the formation of new concepts. Significantly for this study, they are focussed on perceptual interactions, and bodily and linguistic experience in social and historical contexts and they are inherently meaningful because of this embodied grounding. They are neurally encoded. [4]

The following are three simple examples of Image Schemata. The Link Schema is a simple physical or metaphorical structure whereby one object is linked to, and constrained by, another according to a basic symmetrical logic. Examples are the concept of a causal “connection”, or the physical act of connecting a laptop to its power source. The Container Schema has an Interior-Boundary-Exterior structure. It is based on the bodily experience of being a container and of being contained by something. The basic logic is that of the mutual exclusivity of interior and exterior and the necessity of being in one state or the other. The Source-Path-Goal Schema is based on bodily experiences such as throwing a ball. Other examples of Image Schemata as suggested by Johnson [5] are part-whole, centre-periphery, link, cycle, interaction, contact, pushing, balance, near-far, front-back and above-below.

An analysis of concepts of physical relation in the sentence, ‘The book is on the desk’ [3] illustrates the general form in which Image Schemata are implicated in the construction of meaning in linguistic expressions. Meaning here emerges by virtue of the fact that the Image Schemata activated by the linguistic expression are derived from a composite of neurally encoded embodied experiences such as being above, being in contact with, supporting, and so on. These experiences activate specific schemata which give meaning to the word ‘on’ in this expression. The experience of being ‘above’ yields an orientational schema; ‘contact’ yields a topological schema; and ‘support’, a force-dynamic schema. An important aspect of this process is that meaning does not arise through some kind of correlation between concept and objective ‘fact’, or by correlation of symbol and referent, but through a composite of activated schemata.

It is significant that several of these schemata have a structural identity with gestures or gestural components (e.g. source-path-goal schema, centre-periphery, above-below, pushing etc.). Johnson also presents analysis of image schemata across visual, kinesthetic and auditory modalities. [5] Image Schemata,

therefore, may offer a means of organizing gestural analysis in terms of the embodied structures of perception in other modalities.

CONCEPTUAL BLENDING

Lakoff and Johnson [6] argue that there are no literal definitions, only trans-domain mappings via metaphor. New concepts or categories are formed via the conceptual blending or mapping of a set of schemata from one domain to a target domain. For example, conceptual blending based on the Source-Path-Goal Schema yields complex causal patterns, such as that of ice changing state as it melts. Metaphorical conceptualization is, therefore, significantly constitutive of all thought. It is systematic, fundamental to language and thought and embodied. Such conceptual blends are implicated in cross-modal correlations such as judgments of timbre as being, for example, rounded, harsh, warm, heavy etc. It is important to note that gesture is fully characterizable within the framework of conceptual metaphoric mappings across modalities. [7]

SENSORIMOTOR MIMESIS

Sensorimotor Mimesis is any of several means by which humans imitate, consciously or unconsciously, covertly or overtly, an environmental or social stimulus. It is a crucial process in the psychological development of infants. It is often co-activated with other behaviors such as speaking, listening to music and working out logical problems. Mimesis is particularly significant because it appears to be implicated in cognitive tasks such as understanding and in affective responses to stimuli. In particular, vocal mimesis seems to be an important part of the music listening experience. People have the tendency to move in sympathy with music and, it appears, that this behavior is fundamentally constitutive of our understanding of, and affective response to music.

AFFECTIVE/KINAESTHETIC DYNAMICS

There is a formal congruency between motion and emotion. The felt quality of emotion is grounded in demonstrable dynamic patterns of physical expression. This is a reciprocal dynamic, emotions are shaped by motor attitudes, just as physical movement expresses emotion. Empirical studies by Bull [8] demonstrate the inability of subjects to experience particular emotions while adopting postural attitudes considered to be antithetical. Emotional expression is a kinetic phenomenon that has spatiality, temporality, intensity, and manner of execution. Phenomenological bracketing has been used to elucidate the dynamic structure underlying these forms. *Tensional* quality is mediated by the felt effort of postural attitude. *Linear* quality is directional contour of movement. *Amplitudinal* quality is the amount of extensiveness or constrictiveness of a posture. *Projectional* quality is the manner in which energy is released.

Sensorimotor Mimesis, considered along with Affective/Kinaesthetic Dynamics give us a theoretical framework within which analyse corporeal responses to stimuli. Mimetic responses to music are, seemingly, of a piece with our affective, aesthetic response. Affective/Kinaesthetic dynamics offer a structure whereby affective response can be assessed.

Hypothesis: Embodied Schemas for Gestural Manipulation of Timbre

In light of the above, we suggest that responses to timbre stimuli may be characterized as mediated by corporeal mimetic engagement according to affective/kinaesthetic dynamic structures. Timbres ‘feel’ a certain way due to this corporeal engagement. We further suggest that judgments of difference or similarity between timbres is mediated by an Image Schematic/Metaphoric structuring of differing corporeal attitudes. We suggest that such mapping processes mediate meaningful ‘navigation’ of timbre space via physical gesture. This view is supported by the observation that natural linguistic descriptions of timbre tend to emphasize embodied, cross-modal mappings through the use of multi-modal, embodied descriptors.

We suggest that empirical analysis may show that identical Image Schemata are activated by motor, visual and auditory stimulation. Substantial trends in cross-modal association have already been demonstrated. [9] We speculate that common cognitive structures may be shown to account for these correlations and to account for the tendency to describe sound in terms of weight, force, speed, intensity, emotion, spatial position and orientation, containedness, gravity, density, amplitude, colour, order, chaos etc. Essentially, we maintain that identical Image Schemata structure perception across modalities, thus allowing for perceptions of close correlation between certain gestures or shapes for example and certain timbres.

Such correlations would present a grounded basis for mapping schemes in gestural interfaces for sound synthesis. We propose that an empirical study of gesture performance and timbre perception that attempts to find the basis for cross-modal mappings between each is the first step in the design of these mappings for synthesis interfaces.

Design Approach

We propose empirical analysis and subsequent artistic practice-based research in order to elucidate cross-modal patterns. Study 1 will take the form of a preliminary subjective study designed to assess Image Schema activation in listeners in response to audio presentations of synthesized timbres and also, to assess the methodology with a view to later tests. The intent here is to assess the viability of a methodology which assumes that the perception of timbre difference is structured according to Image Schematic principles. Some of the following schema will form the test set; Path, Source-Path-Goal, Center-Periphery, Compulsion, Attraction, Link, Scale, Equilibrium, Full-Empty, Near-Far, Mass-Count, Iteration, Above/Below, Vertical Orientation, Length (extended trajectory), Rough-smooth/Bumpy-smooth.

Subjects will be presented with a set of synthesized timbres. These will be designed to include examples of pitched tones, percussive tones, instrument models and novel timbres. Each timbre example will be presented in pairs, once in an unmodified fashion then with one modification. Timbres will be modified in terms of some of the well-established factors known to be involved in timbre e.g. spectral envelope, harmonicity, spectral centroid, attack and decay envelopes.

A number of methods for assessing Image Schema activation are currently being considered. Subjects may be asked to supply linguistic descriptions of the presentations. The descriptions will be constrained to a limited set of options or to a defined metric and chosen in an onscreen interface. Subjects may also be asked to select the most appropriate graphical representation of an Image Schematic structure that describes the relationship between pairs of presented timbres. Synthesis will be implemented in

Max/MSP as will the user interface and response data collection system. Data will be subjected to statistical analysis in order to identify trends, if any, in subject response.

Study 2 will incorporate gesture capture via inertial sensors and a pair of sensor-enabled gloves. These sensors will enable the tracking of the relative position of the arms and the amount of contraction/expansion in the arms. Subjects will be asked to adopt whatever gesture or gestures they feel are appropriate responses to timbre stimuli as presented in the pilot study. Subjects will also be asked to perform gestures in response to linguistic and pictorial presentations of image schema as detailed above. This test will yield some measure of the corporeal mimetic response to timbre presentations in that it will provide some data on the Linear, Amplitudinal and Projectional qualities of the affective/kinaesthetic response. It will also establish whether it is plausible to assess schema activation in gesture production.

Study 3 will be a test of prototype mappings. If Tests 1 and 2 yield clear data, then there may be correlations between kinaesthetic and schematic activations in the case of both timbre and gesture that can form the basis of the design of systems in a phase of artistic practice-based tests focussing on art installation and music performance contexts.

Conclusion

Embodied Cognition is an area of cognitive science that focusses on perception, cognition and action as profoundly shaped by the human experience of having a body and living in a physical environment and in a culture. It suggests an alternative approach that complements current initiatives in the design of interactive technologies and gestural controllers. Embodied Cognition offers a novel way to analyse the complex interactions between user and technology in terms of the fundamental categories of embodied existence. These categories are involved in organizing perceptual phenomena into coherent, meaningful units and are implicated in the formation of new concepts. In turn, the design of meaningful controllers depends upon empirical knowledge of the fundamental categories whereby human beings interact with and understand their environment. In using these structures as a conceptual basis, it may be possible to identify correlations between gesture and phenomena, such as timbre, in other modalities. Such correlations are the necessary building blocks of a grounded cross-modal mapping schema on which to base the design of controllers that allow for meaningful gestural interaction with sound.

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SECURE INSECURITY - PATTERNS OF TERROR

Robert B. Lisek

Is there a common structure of modern wars, which remains constant in the various wars? What is the relationship between terrorism, modern war and globalization? What is the order of war and terrorist attacks? There are common and predictable patterns to the way in which people are making a war, which go beyond the specific time and place.

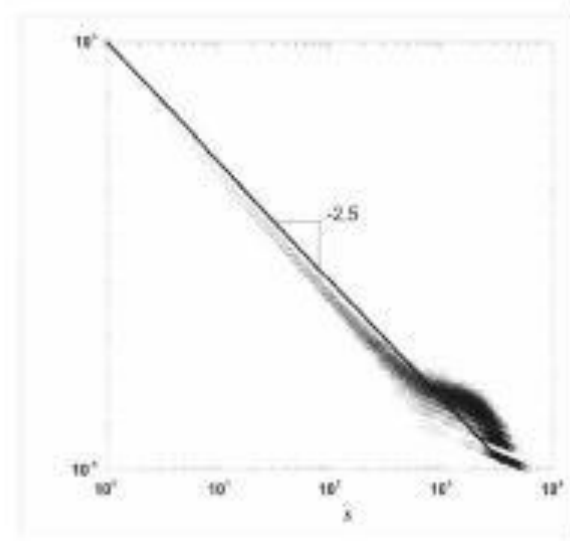


Fig 1. diagram of war, $\alpha=2,5$ "

$$P(x) = Cx^{-\alpha}$$

Diagram illustrating the pattern of war using the power law equation $P(x) = Cx^{-\alpha}$. The components are labeled as follows:

- $P(x)$: Probability of event
- C : constant
- x : number killed
- α : slope of line

Fig 2. pattern of war

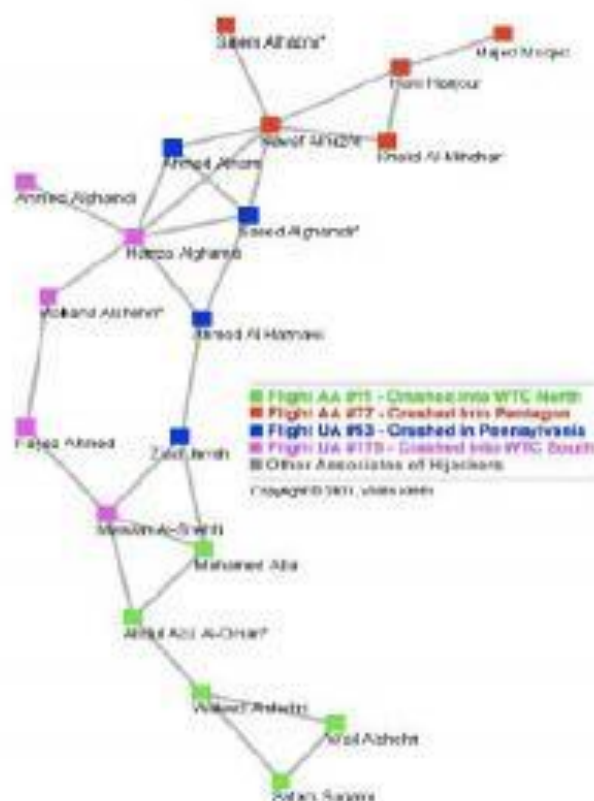


Fig 3. 9/11 terrorists network

There are common and predictable patterns to the way in which people are making a war, which go beyond the specific time and place. We find patterns in a variety of modern conflicts. These patterns are very similar to a distribution of victims of terrorist attacks. These patterns repeat itself constantly beyond differences in geography, ethnicity, religion and ideology.

What is a perfect terrorist cell? i.e. such cell whose structure is most difficult to destroy and disintegrate? How important is the security policy in the formation and development of modern terrorism?

Classically, it is assumed that terrorism is something from the outside, but a deeper study shows that it's something that the system does to itself. Contemporary terrorism is closely related to and generated by the security policy. From our point of view, the right approach is firstly to understand the nature of this global regulation. There's no terrorism coming from the outside. It's something that the system does to itself. Terror acts are seen as mutations and temporary deregulations of the system.

What is the relationship between security and the state? Security is a fundamental principle of the state and a main criterion of political legitimization. Security vs. discipline and law as instruments of governance. On one side, we have hard power structure based on discipline, differentiation and blockade, isolating power and closing the territories and on the second side: security policy associated with globalization, intervening and controlling processes, the security associated with liberalism because security may

only work in the context of transfer of persons and goods. The division proposed by Foucault and Agamben on the hard law and the dynamic activities of the security policy is an artificial assumption. These two areas are closely related, complementary and provide a medium for each other, e.g. processes related to the commodification of human life forcing changes in security policy or law acts, can be quickly changed by power elite. The increasing dynamism and complexity of social space and violent forms of bio-capital make this binary figure of thinking inadequate.

1. CHAOS OF INFORMATION AND OPEN INTELLIGENCE

We live in an accelerated transfer of data and chaos of information. In the media we see the news from Iraq, Afghanistan, Sierra Leone, or terrorist attacks but the conflicts appear to be very difficult to understand.

On the other hand we see how organizations like NSA suck millions of data about citizens from FB, twitter, etc. [open intelligence] by using the company Visible Technologies. Why not do the same? Apply similar methods and build your own software to analyze huge amounts of data for better understanding reality, war, conflicts and terrorism. Of course, you will not get such data from the Pentagon. So you need to find another way to obtain the data. These data are in streams of news that you eat. The whole noise around us actually has information. There are also open network database collecting data about terrorism. You can also use crawlers to obtain data from the Internet: publications of investigation journalists, bloggers, etc. If you can catch enough of these streams of information you can begin to understand terrorism and war.

2. THE SELECTION OF SOURCES. DATA SOURCES FOR TERRORIST EVENTS

The important thing is the selection and filtering of data. The first thing you should do is to collect data. Checking hundreds of different sources of information - from reports of NGO's to newspapers and cable news. Then, these raw data must be filtered. Next you extract key bits of information to build a database. This database contains times of attacks, location, size and type of weapon used.

It's all in the streams of information that we consume every day; you just must know how to select it. You can also use crawlers to obtain the data, see my project on Crash 2.0 concerning plane crash in Smolensk, where the Polish president was killed.

3. PATTERNS OF TERROR

When you have created the database you can search for patterns. What do we see for example when we look at the size distribution of attacks? What does it tell us? This can be done to get the following diagram for the sample data. On the horizontal axis, there is a number of people killed in the attack or the size of the attack and on the vertical axis you have a number of the attacks. This distribution was made for the war in Iraq. [4] It is a precise mathematical way of the distribution of attacks in this conflict and what happened here is quite surprising. The slope of the line is centred on the same values of Alpha, which is 2.5. Why is a conflict, such as the one in Iraq an invariant? Why is there an order in the war? Is it any special in Iraq? But when you look at a few more conflicts (Colombia, Afghanistan, Senegal) you can see the same pattern. These wars are different, with different religious groups, various political and various socio-economic problems but the underlying basic patterns are the same. (Figure01)

The similar pattern appeared, when I've made research for the terrorist attacks. The slope of the line is centred on the same values of Alpha, which is 2.5. We can also generate an equation that could predict likelihood of attacks. The probability of an attack killing X people is equal to a constant times the size of the attack, raised to the power minus Alpha where Alpha is the slope of the line on the diagram. (Figure 02)

Why these different conflicts and a series of terrorist attacks have the same patterns? One explanation is that the pattern describes general human behaviour: that insurgents are changing over time and adapt to the situation. If you do not behave in a certain way in the fight against much stronger opponents you will lose. Therefore, any insurgent force you choose, every conflict, which is in progress, it will look like on this diagram.

Alpha is a structure. It has a stable condition in 2.5. This is the image of war, when it is continued.

4. ABSOLUTE TERRORIST CELL

What is the absolute terrorist cell? What is the structure of indestructible terrorist cells? How to represent cells and how to study them?

Gordon Woo, a Catastrophe Consultant for the company Risk Management Solutions, has suggested modelling terrorist cells as graphs or networks - as collections of points or nodes connected by lines. [7] The nodes represent individual terrorists, and a line is drawn between two nodes if the two individuals have a direct communications link. In Krebs 2002, one finds graphs of the alleged September 11 hijackers. Of course a graph can represent any sort of social network, not just terrorists; for instance, your network of friends etc. [Figure03]. The task of law enforcement is to remove nodes from a graph representing a terrorist cell by capturing or killing members of that cell so that its organizational structure is disrupted. Woo suggests modelling this idea mathematically by asking the following question: How many nodes must you remove from the graph before it becomes disconnected (that is, before it separates into two or more pieces)?

However, modelling the terrorist cells as graphs ignores an important aspect of their structure, namely their hierarchy, and the fact that they are composed of leaders (decision makers, authors of attack plans, etc.) and of followers (couriers, soldiers, etc.). The structure is needed. A partially ordered set, or poset, is such a structure, and lattice theory is the branch of mathematics that deals with such structures. Below, we will delve into posets in greater detail, but first we give a brief overview. Our approach is based on the order theory. [6] A terrorist cell is a group of people, weapons, explosives, machines, or even information, which organizes itself to act as a single unit. The new model is that terrorist plans and decisions are formulated by the nodes at the top of the organization chart or poset (the leaders or maximal nodes); these plans and directives are transmitted down via the edges to the nodes at the bottom (the foot soldiers or minimal nodes), who presumably execute those plans.

Focusing on cutsets is trivial. [2] We do not merely want to break up terrorist networks into disconnected (non-communicating) parts. We also want to cut the leaders off from the followers. If we do that, then we can reasonably claim to have neutralized the network. A cutset is a collection of nodes that intersect every maximal chain. [Figure 05]

However, this approach does not take into account the fact that terrorist cells are continually transformed. So we need something more than posets, we need morphisms that serve as tools for transformation of posets. In other words, the problem is how to insert a dynamics into this static software world. You need to use morphisms. We can understand the dynamics of terrorist cells by using order preserving mappings, fixed points and retracts.

5. POLITICAL, SOCIAL AND PHILOSOPHICAL ASPECTS

What are the social causes and context of the emergence of terrorism?

The primary is feedback between the policy of security and terror. Security is a fundamental principle of state and main criterion of political legitimization. Security vs. discipline and law, as the instruments of governance. On one side we have hard power structure based on discipline, differentiation and blockade, isolating power and closing the territories and on the second side: security policy associated with globalization, intervening and controlling processes, the security associated with liberalism, because security may only work in the context of transfer of persons and goods. [1] The division proposed by Foucault and Agamben on the hard law and the dynamic activities of the security policy is an artificial assumption. These two areas are closely related, complementary and provide a medium for each other, e.g. processes related to the commodification of human life forcing changes in security policy or law acts, can be quickly changed by power elite. The increasing dynamism and complexity of social space and violent forms of bio-capital make this binary figure of thinking inadequate.

Disinformation and secrecy. The difference between the open and the secret implies a hierarchy, the first rule of power. On this difference, the structures called the state are being built. Limiting access to information leads to the emergence of different social classes. Security state is an engine of violence. Acts of terror and disaster are the lifeblood of political actions. That is why they are provoked and stimulated by the power elite. Security requires constant reference to the state of emergency. The quest for security leads to a global worldwide war. You have to change this way of thinking: reject the concept of security as a fundamental principle of state and test new models and constellations of power. The task of politics is to understand the conditions that lead to terror and destruction, rather than control these phenomena, as already occurred. Eternal swing between two extremes: security without freedom and freedom without security. The classic conflict between the ideals of security and freedom: two values that are necessary for a dignified and tolerable human condition, but extremely difficult to reconcile, takes on new forms.

Bio-exchange. The idea of "life" is considered to be included in the domain of technology, both for economic profits and for security reasons. Bio-economy. Biotechnologic artefacts, such as the database of the genome or the bio-chip are a special case of the configuration of knowledge production and bio-economy. These artefacts are a symptom of the commodification of life. The terrorist act is a knot in which a large number of social processes intersect. Meta-capital. Everything is partially interchangeable, as everything is connected. The relationship between the Capital and the Code becomes unsolvable. Is every code a capital? Is all the capital a code? Life becomes a currency of the genetic code. The code provided for trade, works as a social marker, as a new form of capital.

Another important cause of terrorism is an acceleration of flows and globalization. We live in societies where complexity and rate of flow of information, goods and people are constantly increasing by the

use of automation. It generates new social problems. Just as the increasing of metabolic functions of society such as the production and distribution have led to economic globalization, automation of information processing leads to the globalization of human cognitive abilities and decision-making mechanisms.

This results in a growing separation between the power (i.e.: the ability of doing things) and politics (i.e.: the possibility to decide which cases to settle). A few decades ago, they lasted seemingly inseparable connection, living in a state-nations construct. Now they live in the separate spaces: power in the space flows, politics in the space of places. Currently, the existing political institutions, invented in the course of two centuries of modern nations and states, are not relevant just as the tools of collective action for solving global problems like terrorism. Political action is not keeping up with the already globalized finance, industry, exploitation of natural resources, trade, migration of people and information, terrorism, trade of weapon and drugs.

The flow of people and building of ghettos. Not all individuals and groups have agreed to become a part of such a global system. Some individuals, nations or groups of countries do not want to be "integrated" in the transnational social superorganism.

The problem is mass migrations of people banished from homeland, people of "unnecessary" destitute. Ethnic, linguistic or religious diasporas in closed ghettos and crowded in close proximity. Selected districts in large cities serve as dustbins for the problems created by global powers.

Another problem is that this kind of technological progress increases the gap between the rich and the poor, and especially between those who have access to information and those who do not. The result is the emergence of a "subclass" of people excluded from the benefits of the flow. Today, the average income per capital richest country, Qatar, is 428 times greater than in the poorest country, Zimbabwe. [3] The richest fifth of the world appropriates 74% of the planet's annual income, while the poorest fifth has to settle for 2%. The first victim of growing division is democracy, where getting things for survival will become the main objective of the struggles and wars between different classes and groups.

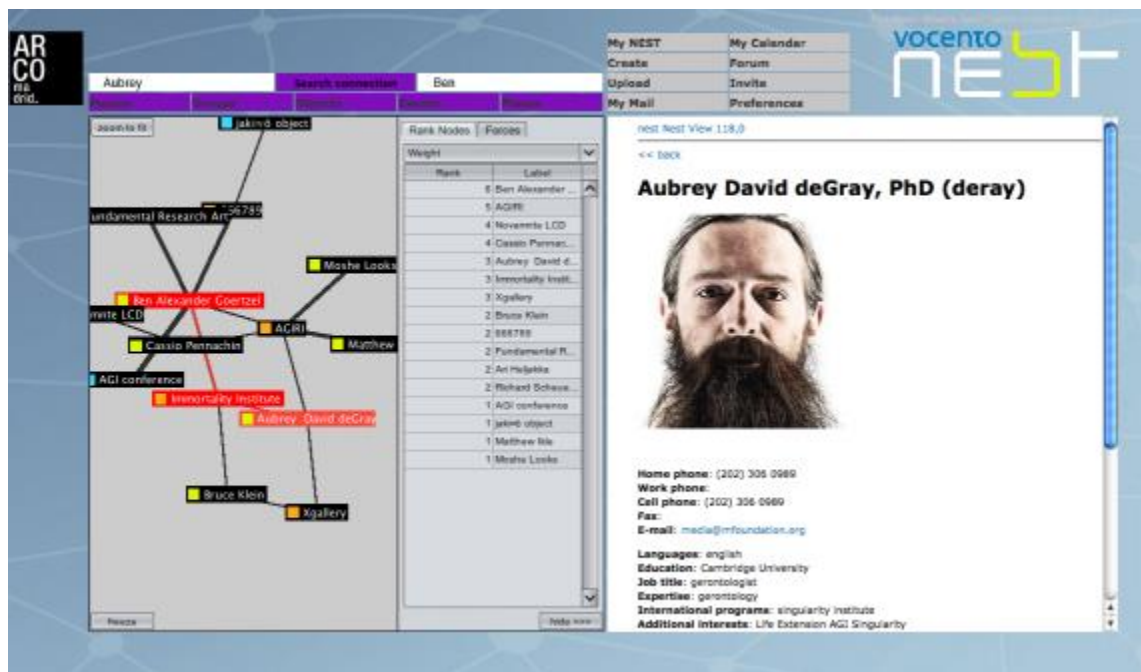
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TOWARD COMBINATORIAL COMPUTER SCIENCE

Robert B. Lisek

The primary goal of this article is to focus on the dynamics and processes of creation and transformation of organisms, structures and social organizations. A development of communication networks has caused research on systems that can function as 'neural system' for social organism. However, these earlier models remain on the level of metaphor. Our approach is more formal and uses mathematical tools.



NEST- ARCO Art Fair

1. Acceleration and 'global mind'

Connectivity, bandwidth and the size of resources grow. The increasing flow of information will create a true neural system of society in the future. Anarchy in the Internet proves its potential. The first step is to create a new Internet that learns new associations between data or concepts. Until now, a creation of links is done by hands, by authors of the documents, who determine what other documents are relevant to their text. This process is very inefficient. Search engines are still very archaic and could only partially alleviate this problem. We need 'thinking' Internet, which reinforces connections between documents

that are often used together and weakened between rarely used documents. 'Thinking' in means of using a dynamic network of connections for solving problems or responding to questions.

Based on AGI research and Internet extensions, progress will accelerate when a higher than human intelligence emerges. Large fast computer networks connected with human users can "wake up" as superhuman intelligent entities. We can create superhuman artificial intelligences in the next thirty years. Shortly after that, the era of human will end.

2. Portable knowledge development environment

If we want to create a real "neural system" of modern societies and transform the present society into the global mind, we need a good framework - portable knowledge development environment. We are looking for fundamental insight concerning human mind and its relation to the world, not only on a metaphorical level, but also as a strict formal framework. The main features of the framework:

Creativity: rapid construction, comparison and transformation of different structures with local rules and global behaviour

Flexibility: ability to support multiple tasks and representations

Soundness: Rooted in a solid mathematical basis. We use labelled, weighted, partially ordered sets (reflexive, transitive and antisymmetric) - propose them as base for a canonical framework for representation of knowledge and semantic information.

Self-reference: the structure must be able to relate to itself.

Inference and Data Mining: inferring new information from earlier data. Hyperset transformation and data mining methods (e.g. sequence analysis, network analysis, latent semantic analysis, and other statistical tools) to uncover hidden patterns and structural relations.

Diagram GUI: empirical tests as the way to find the appropriate mechanisms, guide this process by visual insight and graph manipulation.

The Development Framework would enable to build new structures, compare them in detail and then observe them in action. My general intention is to build systems, which have local rules, and then to observe their global behaviour. The environment would enable comparison of how changes in local systems will affect their global behaviour. I'm interested in gaining further insight into how to clarify the notion of transition from the local to the global, and how various elements come together and apart in the evolutionary dance.

As a result, we are interested in creating a software, which will be able to handle a great many different problems quicker and more effectively than man. Here, I'm presenting a conceptual framework for the development of a ,class' of intelligent systems. I emphasise on a ,class', rather than a single system. A system is intelligent not because of what it can do, but because of what it can learn to do. An intelligent system adapts itself to its environment and works with incomplete knowledge and resources. More precisely, the system has a set time and is always ready for new tasks, processing them in real time and learning from its own experience.

3. Retracts

We study systems in relation to their abstract properties, such as structure and organization. In our approach, it is essential to use the theory of ordered sets and fixed points of morphisms. In [1] we present state of knowledge in this field and the results based on new results related to retracts. We draw attention to the methods of representation, manipulation and measurement of partially ordered sets (reflexive, transitive, antisymmetric relations). Retracts and fixed points are central for the recursion and computability. Fixed points are important because they accurately characterize solutions of recursive definitions. It is convenient to describe the function using recursion, especially in programming languages. The problem is whether the functions are well defined. The idea is a method of successive approximations. The process of approximation provides fixed points, which are solutions of recursive equations.

Framework should be based on hyperposets - weighted labelled partially ordered sets. They allow the use of n -ary ordered relations represented as hyperedges – such edges that connect n nodes simultaneously. Hyperposets allow the building of hierarchies, ontologies and semantic networks. Posets are a subclass hyperposets. In hyperposets you can connect components in many different ways. Self-reference is possible, you can write an equation $f = f(f)$ with mathematical consistency.

A function $f : P \rightarrow P$ is order-preserving if, for all $p, q \in P$, $p \leq q$ implies $f(p) \leq f(q)$. A subset $Q \subseteq P$ is a retract if there exists an order-preserving map $f : P \rightarrow Q$ such that $f(q) = q$ for all $q \in Q$; the map f is a retraction. An element $p \in P$ is a fixed point of a function $f : P \rightarrow P$ if $p = f(p)$. The poset P has the fixed point property if every order-preserving map on P has a fixed point. A poset has the fixed point property if and only if every retract does .

4. Creation and transformation of organisms, structures and social groups.

4.1 We need formulas that explain how organisms mutate and propagate. Not only as in cellular automata or in genetic programming, but general and basic equations and new formalisms that allow self-reference, which is crucial for describing conscious systems. This means systems, that are able to "think themselves", to understand its limitations, create its own rules and modify their goals and methods. We also need simple equations to measure transformation and spreading. The key thing is to understand the evolution, the way in which new organisms are created and transformed. New structures are created by mutations and functions. For example, point mutations: remove an element (node) or insert a new element (or group of elements).

The most simple way of defining metrics in structure space is the number of point mutations required to transition from one organism to another, from one social organization to another. This is the general idea, but sometimes we need a more subtle way to define the distance of mutations, as $-\log_2$ probability that one organism is created from another by single mutation or retraction.

4.2 Self-production.

We refer to older tradition - cybernetics and systems theory. Although some old cybernetic models are based on central, hierarchical structure, new methods emphasize self-organization, autonomy, decentralization and interaction of many factors. Several models have been developed that can be used both for organisms and social systems: Miller (1978) - living systems theory, Maturana and Varela (1980, 1992) - theory of autopoiesis, Powers (1973, 1989) - perceptual control theory and Turchin (1977) - metasystem transition theory. In this approach, both social and biological organisms can be seen as special cases of more general category - "life" or "autopoietic system". Autopoietic (greek word for "self-production") system consists of a network of processes that recursively produce their own components and separate itself from environment. For example: living cells can be characterized as a complex network of chemical processes, which constantly mutate and produce molecules necessary for the functioning of cells. Reproduction is often seen as a function for defining "life". However copying without autopoiesis, which can be described more accurately as the replication, does not mean life: some crystals and viruses can replicate without life. We can talk about autopoiesis of societies where physical components of society can be described as its human members and their achievements (buildings, cars, roads, computers, books, etc.). Each of these components is produced by a combination of other elements from system.

4.3 The problem of the border. In the original definition of autopoiesis a fact is added, that the autopoietic system should produce its own borders or spatial or topological separation of system from the environment. In contrast to biological organisms, there is no clear boundary in social systems. For example, the state can produce most of its basic elements internally but it also needs to import some components (people, artefacts) and expertise from outside. This means that borders in social system are fuzzy.

4.4 Dynamics and spreading. Morphisms Processor

The most important is the transformation of structures. Morphisms are transformations of ordered sets. A topological structure of the network (weight of links and priority distribution) is changed through the use of morphism. We define a new concept: the energy of morphism. The energy of the morphism of an order set is a scale-invariant of morphism: function from morphism to rational numbers. The energy of set O is the infimum of energy of the set of all the morphisms of the order set of type O . The type and canonical form of an order set is based on a number of irreducible elements. Intuitively, the connection between the complexity of the morphism and its energy is simple: the more complicated morphism, the higher the energy.

These kinds of studies have many applications in creation of Artificial General Intelligence and finding solutions for problems associated with the emergence of complex, combinatorial objects and large data sets.

5. Automatic Programming

5.1 Automatic programming is a strong field from the very beginnings of the AI. PSI project at Stanford [2], which constructed a LISP, seems to be an important point of classical automatic programming. The automatic programming is "AI complete" in the sense that it requires general knowledge to understand what program/user wants to achieve (without determining details in a programming language). Artificial General Intelligence (AGI) is connected with 'unlimited' ability to learn. Framework must be experimental, cognitive architecture, which learns by modifying and extending itself, including developing an ability to learn (better learning). Let's assume that learning is treated as programming: learning is designing a new algorithm. Learning as an ability to write programs. Learning as a general knowledge of the world is

to build a model that is able to predict the consequences of events or activities. In this perspective, general program learner is a program that writes programs. It is a program that has to invent both the algorithms and representations. Such programs can easily operate on each other and produce other programs, much in the way that molecules can react and produce other molecules. For human programmers, the programs become more complex, it makes sense to develop new languages in order. This regularity also holds for AI systems. Unlimited learning system will be a system that invents new programming languages.

5.3 Architecture and machines based on partially ordered sets

LISP introduced abstract syntax tree (AST) as a base type of data and automatic memory management method. It was also probably the first functional programming language. PLANER, PROLOG and a variety of systems have introduced automated theorem proving, now widely used in most modern languages. The objects oriented semantics of many modern languages, derives from the architecture of systems from the 70s'. Currently, we need to create a new class of languages in which a base type of data will be partially ordered set. Ordered sets are richer structures than chains and trees used in all languages and computing machines that we know. At the same time posets are structures that we can strictly control. Therefore, building a new architecture and computers based on posets would be an important step towards the implementation of AGI and global mind idea.

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AVATAR MANIFESTO REDUX

Gregory Little

In this presentation, “*Avatar Manifesto Redux*”, I will bring specific trajectories of the 1999 essay “*An Avatar Manifesto*” to bear on some examples of the current state of avatar research and construction.

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In 1989, after taking a test drive in “Reality Built for Two”, a virtual reality simulator built by Jaron Lanier and VPL Research, I began to speculate upon how we might appear to one another in Multi-user Virtual Environments (MUEs). The potential for choosing non-consensual, mutable, or hybrid self-representations led me to create a series of images called ‘identity constructions’, to design prototypes of identity creation interfaces, and to write speculative theory about the ramifications of this process. The decade hosted the emergence of the World Wide Web and Virtual Reality Modeling Language (VRML). Online spaces like *AlphaWorld™*, *WorldChat™*, and *WorldsAway™* combined MUDs with 3d virtual worlds. The popularity of Neil Stephenson’s novel *Snow Crash* brought the term avatar into public acceptance, and a plethora of cinematic efforts beginning with Disney’s *Tron* (1982) including *Lawnmower Man*, *Brainstorm*, *Until the End of the World* and the television mini-series *Wild Palms* warned us of the dangers of our inevitable virtual futures. These fictions lost their momentum as the web increasingly became a space for the exchange of goods and services, for surveillance and mapping of consumption. As our enthusiasm and patience for MUEs and real-time 3D peaked mid decade, it became clear to me that the most significant property of the avatar was the freeing of personal identity from mapable relationships to consistency and social consensus. I wrote that the use of the avatar in on-line shared environments had the potential to become a revolutionary polymorphic trope as the human driver could choose to be unhampered by issues of class, race, gender, beauty, or age in how they represented themselves in MUEs. The avatar could become a potential site of resistance, a trickster figure, a viral glitch in the flow of online commerce.

In 1999 I published “*An Avatar Manifesto*”, an essay that posited a historical and theoretical definition of the avatar, contextualized the avatar among other types of representation, and articulated a set of poetic strategies for building avatars intended to resist the inevitable construction of virtual space as a new utopian shopping mall. The essay referenced Donna Haraway’s “*Cyborg Manifesto*” of 1986 and used Artaud’s trope, ‘The Body w/o Organs’ as a point of reference for the construction and articulation of representations of the self within digital, virtual space. In the current essay, “*Avatar Manifesto Redux*” I will revisit the definition of the avatar, and bring specific trajectories of the the avatar to bear on current state of avatar research and construction. I find at least four recurring variants on the avatar to be of interest: the profile, the portrait, the tool, and the double.

WHAT IS AN AVATAR?

Avatars are online, virtual constructions that both represent and act as a tool for a user in shared virtual spaces. As is widely understood, the origins of the term lie in Hindu philosophy: AVATARA-Sanskrit.; ava-'down', tarati-'he goes, passes beyond' literally, 'a descent', a conception described in the *Bhagavad gita*, 4th Teaching, 1-8 where Krishna confides: "when goodness grows weak, when evil increases, I make myself a body," [2] or, an alternative translation: "Whenever righteousness wanes and unrighteousness increases I send myself forth." The use of the term avatar to represent the self or user in the context of shared on-line Internet environments first occurs in the early 1980's with the development of LucasFilms's *Habitat* project and later came to popular consciousness with the success of the novel *Snow Crash*, where avatars are the digital representations of the inhabitants of the 'MetaVerse'. The past two decades have been marked by our pre-occupation with 'sending ourselves forth' into parallel worlds of signification.

THE PROFILE:

Today the most prevalent on-line representation of the self is the user profile, as found on social networking sites like: *LinkedIn*, *Friendster*, *MySpace*, *Twitter*, *Google Profile*, *Badoo*, *Bebo*, *Jaiku*, and *Facebook™*. User profiles are often information dense and provide tremendous involvement on the users part for tweaking and refining.

As Christine Rosen states in "Virtual Friendship and the New Narcissism," users of social networking sites are committed to self-exposure. The impulse to collect as many 'friends' as possible on a social networking page is as much an expression of the need for status as it is the need for friendship.

"The creation and conspicuous consumption of intimate details and images of one's own and others' lives is the main activity in the online social networking world." [3]

This constant self-monitoring and profile tweaking can be understood as classic Narcissism playing out on a massive social scale. Sherry Turkle has posited in "Always-on/Always-on-you" that our current, personally/personality-presentation technologies, especially social networks and smart phones, take self-monitoring to a new level. "We try to keep up with our lives as they are presented to us by a new disciplining technology, our new "relational artifacts." [4] As most of us spend a great deal of time constructing, monitoring, updating, and editing our various profiles, it seems that the purpose of the profile is, following Turkle's logic, to literally make the self into a relational artifact; to expose the self in all its monotonous uniqueness, of conventional individuality, of distinctive sameness, and to make the self available for monitoring by others. Earlier examples of this level of self-exposure include Jennifer Ringle's lifecast "JenniCam" (1996-2003), and Eva and Franco Mattes "Life Sharing" (2000) where the artists turn their personal computers into open source servers. Profile browsing is another form of monitoring and "data mining", a one-way action and voluntary voyeurism as we passively scan another's personal archive without their lived presence or knowledge. *Facebook™* is largely not face to face, our profiles are not temporal or spatially co-present with the profile of the other.

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THE TOOL:

Edward Castronova, in his “Theory of the Avatar” posits that we, or more precisely, our minds 'drive' our avatar representations in a variety of spaces, both real and virtual.

“When visiting a virtual world, one treats the avatar in that world like a vehicle of the self, a car that your mind is driving.” [6]

Castronova posits that the avatar is essentially a body that represents a mind; that the body can be real or virtual...in other words, we always occupy an avatar, whether in real life on earth, or *Second Life™*, whether a flesh and blood body or a body of pixels and light. For Castronova the driver of the avatar is the mind, the earthly body is not the seat of the mind, of sensation, breath, of life itself; but merely an avatar we can choose not to inhabit, a tool in our toolbox. Castronova writes that we make our choice of tool dependent upon what we want to accomplish in a particular world, and that we make this choice according to three vectors: *x* is the fixed non-physical characteristics of the agent, *v* is the changeable avatar attributes, and *z* is the changeable world attributes. Our choice is dependent upon economy and utility, on which tool or representation will work best in the chosen world according to the perimeters of the vectors *xvz* as defined above. The ramifications of this definition are useful and insightful, but I must disagree with his definition of the avatar. Such an idealist view of the nature of mind is useful to Castronova's theory. We can all imagine Matrix-like futures where all sensation is virtualized; the corporeal body hangs in a closet, and the brain is in a jar. This view is not tenable. Rather, I support a materialist view of the relationship between mind and body which holds that the mind is a largely physical entity and that mental states are largely derivative of physical ones. Regardless of whether we are in SL or RL the corporeal body is required to sense and process either world. We use our sense organs whether located or co-located. Despite of our level of immersion in a virtual world we are constantly “poked” by the physical expressions of the real world, of biological processes and of needs of our bodies. Although the “driver” and “vehicle” relationship is a useful description, which draws from the prefix 'cyber' (as in cybernetics), meaning 'to steer', the avatar is not the automobile. The avatar is a highly unique form because it involves an ontological pairing, a contradictory hybridity. The avatar is both the driver and the driven, the lived representation composed both of flesh and light, an 'I' that makes a body. The avatar is a 'viractual' object; the contradiction between the virtual and the real is merged at the avatar's core. Castronova weaves an argument that the proper choice of the avatar can, and I agree, have utility and initiate positive change in our lived experience. I must simply add to vector *x* (the fixed non-physical characteristics of the agent) that the fixed physical characteristics of the agent mold the equation. The translation of live body and lived experience into a simple rasterized image is too lossy a translation to be useful. Liveness, the temporal co-presence of the lived body transmitting data and the simultaneous expression of that data as virtual representation (where duration is the same for the real and the virtual) is a definitive property of the avatar. The avatar joins the a computed representation with the presence of a lived body transmitting data, right now.

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The 38,100,000 hits returned when googling 'avatar portrait' is testimony to the ubiquity of the association of avatars with portraits (and the popularity of Cameron's *Avatar*). The internet is filled with avatar portrait generators, galleries of avatar portraits, services to create custom avatar portraits, artists willing to paint canvases of your avatar, even those claiming the ability to represent the aura of your avatar. As I wrote in 1999:

"the population of avatars could come to include the history of portraiture in painting, photography, and sculpture, as a projection or passing through of once living individuals into the virtual, timeless space of representation, metaphor, and mimesis." [7]

In "Life and Its Double," [8] (2007) the art critic and curator Domenico Quaranta, while discussing the work of Eva and Franco Mattes, writes of the status of the avatar as a portrait, and seeks to define avatar portraits as a new genre within the canon of Art History. Indeed it is a very appealing construct as I also believe that the avatar is a new, definitively unique genre of portraiture. However I cannot fully endorse Quaranta's construction of its significance or meaning as outlined in his essay "Life and its Double." A distinction must be made between the portrait of an avatar, which is not in and of itself an avatar; and the avatar defined as a portrait. Quaranta outlines multiple arguments for the avatar as a new genre of portraiture while discussing portraits of avatars. Avatar as portrait is in my estimation a far more interesting candidate for a new genre in Art History than portraits of avatars. As I shall argue, avatars expand and redefine our notions of image, representation, liveness, self, and identity.

The collapsing of the definitions of avatar and portrait is useful to characterize the avatar in extant art historical classifications, but the insistence that the Mattes portraits of the avatars exhibited in-world in "Ars Virtua" are of the "same substance as their subjects" [9] is in my view incorrect. As argued above, the avatar is more than "in-world" pixels or image, the avatar is both "in" and "out of world", it is driven in real-time by a corporeal person in a real, single location. Philip Rosedale, the creator of *Second Life*™, places emphasis on embodiment when he defines avatar as "the representation of your chosen embodied appearance to other people in a virtual world." [10]

To use Castronova's description, the Mattes' portraits of avatars are no longer being driven, they are now parked or abandoned avatars. Although like avatars they are representations of agents or users, they must not be confused with avatars, they are now portraits in the traditional sense, and like all such representations disconnected in time and space from their referents, the real-world human acting in real-time from a specific single location.

Each of the ideas about avatars that I address above deny, compromise, or underplay the existence of the real-time user as a condition of the avatar. As noted above, Joseph Nechvatal writes that the paradoxical condition of a viractual object fuses the computed representation and the uncomputed corporeal, therefore to define the avatar as a viractual object "tends to contradict some central techno cliches of our time." [11] It is the condition of duality in the avatar, the parenting of the representation of the self to a real-life user in real-time that defines the avatar's unique ontology and distinguishes it from other forms of representation.

The avatar has proven to be a far more unique construct than I realized when I wrote "A Manifesto for Avatars" twelve years ago. Unlike most forms in telematic culture, e.g. the profile, the avatar does not

lack a Benjaminian 'aura' The driven avatar is not lacking in "its presence in time and space, its unique existence in a place where it happens to be," that is to say, it has what Benjamin called "authenticity," or, an "aura." Because the nature of an avatar is viractual; its methodology is essentially performative, involving the real-time transmission, through image, text, and gesture, of the simultaneous lived experience of its driver/user/agent. Any attempt to archive an avatar must include not only a library of visual representations, but a dataset of gestures, sounds, texts, and algorithms as well as information about the corporeal uncomputed body. Data-mining by the coding authority could provide this archive, and it should be open-source. When one encounters another avatar in a MUVE space like *Second Life™*, we must do so with a full knowledge that, like a psychological double, we are being presented with an uncanny condition that is both familiar and unknown, both revealing and hidden. There is a lived but hidden presence behind the avatar's back, ontologically and spatially separate but temporally and intentionally bound. This corporeal force, like the beloved river for Narcissus, is the origin of signification. Like the psychological or literary double the origin of the expressive power of the avatar lies in paradox and in fusing of opposites, in the condition Freud called the 'uncanny.' For Freud the uncanny was a province of aesthetics.

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The collapsing of the definitions of avatar and portrait is useful to characterize the avatar in extant art historical classifications, but the insistence that the Mattes portraits of the avatars exhibited in-world in “Ars Virtua” are of the “same substance as their subjects” [9] is in my view incorrect. As argued above, the avatar is more than “in-world” pixels or image, the avatar is both “in” and “out of world”, it is driven in real-time by a corporeal person in a real, single location. Philip Rosedale, the creator of *Second Life*™, places emphasis on embodiment when he defines avatar as “the representation of your chosen embodied appearance to other people in a virtual world.” [10]

To use Castronova's description, the Mattes' portraits of avatars are no longer being driven, they are now parked or abandoned avatars. Although like avatars they are representations of agents or users, they must not be confused with avatars, they are now portraits in the traditional sense, and like all such representations disconnected in time and space from their referents, the real-world human acting in real-time from a specific single location.

Each of the ideas about avatars that I address above deny, compromise, or underplay the existence of the real-time user as a condition of the avatar. As noted above, Joseph Nechvatal writes that the paradoxical condition of a viractual object fuses the computed representation and the uncomputed corporeal, therefore to define the avatar as a viractual object “tends to contradict some central techno cliches of our time.” [11] It is the condition of duality in the avatar, the parenting of the representation of the self to a real-life user in real-time that defines the avatar's unique ontology and distinguishes it from other forms of representation.

The avatar has proven to be a far more unique construct than I realized when I wrote “A Manifesto for Avatars” twelve years ago. Unlike most forms in telematic culture, e.g. the profile, the avatar does not lack a Benjaminian 'aura' The driven avatar is not lacking in “its presence in time and space, its unique existence in a place where it happens to be,” that is to say, it has what Benjamin called “authenticity,” or, an “aura.” Because the nature of an avatar is viractual; its methodology is essentially performative, involving the real-time transmission, through image, text, and gesture, of the simultaneous lived experience of its driver/user/agent. Any attempt to archive an avatar must include not only a library of visual representations, but a dataset of gestures, sounds, texts, and algorithms as well as information about the corporeal uncomputed body. Data-mining by the coding authority could provide this archive, and it should be open-source. When one encounters another avatar in a MUVE space like *Second Life*™, we

must do so with a full knowledge that, like a psychological double, we are being presented with an uncanny condition that is both familiar and unknown, both revealing and hidden. There is a lived but hidden presence behind the avatar's back, ontologically and spatially separate but temporally and intentionally bound. This corporeal force, like the beloved river for Narcissus, is the origin of signification. Like the psychological or literary double the origin of the expressive power of the avatar lies in paradox and in fusing of opposites, in the condition Freud called the 'uncanny.' For Freud the uncanny was a province of aesthetics.

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HACKERSPACES: FROM ELECTRICAL TO CULTURAL RESISTANCE

Ricardo Lobo

Hackerspaces are community-driven spaces where people gather to socialize, experiment, learn and develop projects with technology. Over the past four years, these spaces have seen a remarkable growth in number and visibility. In this paper, we examine how the practice of hackerspaces can be understood as a form of cultural resistance by analyzing some views and attitudes towards the economy, education, society and politics.

Introduction

The purpose of this paper is to contribute to the study of this global movement of spaces and communities around the globe where people create and experiment with technology, known as hackerspaces. It is a phenomenon that in recent years has shown a considerable expansion. Despite that fact, hackerspaces are still largely underresearched.

Our research interest grew out of the field work we've been doing in Audiência Zero. Audiência Zero is a Portuguese cultural organization responsible for a network of spaces of creation and experimentation with technology that in recent years has re-defined itself largely under the influence of the hackerspace model. Our ultimate interest is to investigate the actual and potential impacts of the hackerspace movement in the social, political, economic and cultural spheres.

Mitch Altman, founder of NoiseBridge, once said, in passing, that the future of everything is on the hackerspace. A highly colored statement of course, but the idea that the hackerspace is an innovative and dynamic concept with much to offer to society at large is something that we believe deserves attention.

Hackerspaces are local communities who share a global culture, and are a direct descendant of the hacker culture. Hackers manifest their culture through very specific practices and values. This hackerspace culture is in many ways, as we shall see, contrary to the cultural discourse of dominant political, social and economic structures.

Nevertheless, hackerspaces are not closed organizations, they are in permanent contact with society, always interested in showing what they do and explain why they do it. This form of relationship with the outside world, makes hackerspaces values and practices publicly known. This, in turn, might influence the way other people see, think and behave. This form of cultural resistance is what we are going to address in this paper.

What is a Hackerspace?

Hackers are the first to point out that there aren't two hackerspaces alike (Schneeweisz 2009). The main reason for this has to do with the fact that hackerspaces are the direct product of the communities that

created them. Regular discussions about the definition of hackerspace have occurred in the community, but there isn't an agreed, compact definition of hackerspace so far (Moilanen 2010).

Nonetheless, we will provide a tentative definition of hackerspace, that we believe will suffice for the purpose of this paper. We will then elaborate a little on the definition in order to adequately explain the main elements.

For us a hackerspace is an open, community-driven space with shared resources, where people with common interests, learn, experiment and develop projects, through an organizational model based on peer-learning, collaboration and knowledge sharing.

A hackerspace needs a physical space for members to meet and work. Here is where the resources are located, where the activities take place. Usually these spaces are rented. The rent and all the operational costs are paid by members fees. Ideally members will have 24/7 access to the space which means that each member has to have a key.

Around the space a community settles and grows. The community is responsible for financing and managing the space and the resources, usually through elected bodies. This community is, in many cases, open, by which we mean: receptive to new members, organize activities in which non-members can participate and build ties with outside people and organizations.

The people who create the community around a hackerspace have common interests, that's why they gather, cooperate and maintain a hackerspace. The interests of these hackers can be quite varied, but fairly typical is the interest in technology, science and art.

Those interests determine the resources available in hackerspaces, but other factors are important too, like money and available space. Examples of shared resources that are commonly found in hackerspaces are: Internet access, electronic equipment, workshop tools and prototyping machines (3D printer, CNC).

The community exists because its members share resources and common interests which usually materialize in experiments and projects, this means hackerspaces are spaces of experimentation and development, not just socialization.

In the community there is a rooted practice of information sharing and collaboration. Members with different levels of knowledge and different backgrounds are available and willing to share what they know with others. This is one of the biggest selling points of hackerspaces, a community of people from various fields, with very good skills and available to help whenever necessary.

So these elements are very relevant to the definition of a hackerspace: space, community, common interests, resources, collaboration, creating, experimenting and sharing. Some of these elements relate to physical resources; other to the activities that occur there; and finally, to the values and practices embodied. This multidimensional reality is one of the reasons that make defining a hackerspace a difficult task. A hackerspace is not just a space for hackers, a hackerspace is the combination of all those elements.

Hackerspaces and Hacker Culture

It is not uncommon to begin the history of hackerspaces in Germany in 1981 with the founding of Chaos Computer Club by Wau Holland or to try to find ancestors in the U.S. by referencing projects like the New Hack City, the L0pht and others (Schneeweisz 2009). Nonetheless, the first examples of hacker-spaces as we now know them, were founded in the mid 90's in Germany, and these were the c-base in Berlin and C4 in Cologne.

These spaces, according to Nick Farr (2009), took a decisive step, they opened up to society, and started an open relationship that proved "...Hackers could be perfectly open about their work, organize officially, gain recognition from the government and respect from the public by living and applying the Hacker ethic in their efforts."

The novelty of spaces like C-base, C4 and the spaces they inspired, is their relationship with society at large and the public visibility and dissemination of hacker culture, which is, ultimately, the importance of the hackerspace (Farr 2009).

Hacker culture dates back to the fifties and sixties and over the decades has been evolving through different generations. Steven Levy (2010) in his book *Hackers: Heroes of the Computer Revolution* gives a detailed account of the birth of the hacker culture and its history. Levy is most famous for his formulation of the hacker ethic, a particularly important piece of hacker culture.

This hacker ethic among other aspects was based on freedom, access and circulation of information and knowledge, distrust of authority, promotion of decentralization and the belief that computers can create a better world (Levy 2010).

The recent history of hackerspaces has a pivotal development around 2007. In this year, dozens of American hackers made a visit to some German and Austrian hackerspaces, with the purpose of importing the hackerspace model to the U.S. This expedition resulted, ultimately, in the founding of some famous hackerspaces, including NoiseBridge (San Francisco), HacDC (Washington), NYC Resistor (New York) and to what Nick Farr (2009) calls the third wave of hackerspaces.

After that, the number of hackerspaces grew quickly and consistently considering the numbers available on hackerspaces.org, which is the most complete information source there is about the phenomenon. In the beginning of 2007 there were something like 30 to 40 hackerspaces, today, as of this writing, July 2011, there are 480 active hackerspaces all over the world, with special incidence in Europe and the USA (Hackerspaces.org 2011).

Cultural Resistance

The most common conception of resistance in social theory is the emancipatory opposition to domination (Hoy 2005, 2). The word by itself can mean exactly the opposite too, it can mean, the resistance of domination to emancipatory efforts. In this sense resistance is just an opposition of a force to another (Hoy 2005, 2).

In the context of this paper we are using resistance in the first sense, the most common one, in the sense of opposition to domination. Furthermore, the resistance we address here is what can be called

cultural resistance and has been described by Stephen Duncombe (2002, 5) as “culture that is used, consciously or unconsciously, effectively or not, to resist and/or change the dominant political, economic and/or social structure.”

The issues we are about to describe and discuss, are examples of the way hackerspaces and, the hacker culture they represent, resist the dominant political, economic and social structure. Despite the fact of claiming political agnosticism (Schneeweisz 2009), hackerspaces influence the cultural discourse, by creating living spaces with a shared culture that is at odds with the dominant models. This act can be seen as a political act.

Cultural resistance, as Ducombe (2002, 6) remembers, can be thought of as political resistance, since cultural resistance is mainly a rewriting of a cultural discourse, “a shared set of symbols and meanings, that we all abide by”, which some argue is essentially what politics is.

In this section we will present some examples of shared values and common practices in the hacker-space movement. With this we'll try to show what exactly is this hackerspace culture and in what way it resists the dominant structures.

COMMUNITY

As discussed previously, community is inherent in the concept of hackerspace. For us, as well as other authors (Moilanen 2010), hackerspaces act as a third space, a space that people go to as a place between home (first place) and work (second place). These third places serve to satisfy essential needs of socialization that are felt strongly and increasingly in contemporary societies (Oldenburg 1999).

This aspect of hackerspaces is one of the possible explanations for the success and expansion of the concept worldwide. Hackerspaces are like sanctuaries in a society that is losing the community reference. The importance of community is widely recognized in reports made by members of hackerspaces. Mitch Altman, for example, said, quoted by Dylan Tweney (2009), “in our society there's a real dearth of community (...) [at hackerspaces], people get a little taste of that community and they just want more.”

GIFT ECONOMY

Underlying the concept of hackerspace we also have the concept of sharing. Sharing space, sharing tools, but most important knowledge, information and time. If we analyze the behavior of members in hackerspaces we see that there is a culture of sharing that underpins all the activity and goes beyond the members themselves, opening up to visitors and the outside world.

In hackerspaces skilled members share with the newcomers their knowledge so that they can pass the knowledge onto others, and so forth. This is done without any warranty or agreement that the person that helps will in the future be helped in return. This, however, does not paralyze the free exchange in hackerspaces. This economy works because there is confidence that others will do the right thing when the time comes.

Hackerspaces are an example of a gift economy, an economy where several goods and services, namely information, knowledge and time are transferred without an explicit specification about future rewards. This contrasts with both market and barter economies.

This gift giving practice goes beyond the immediate community, is how they relate to the world. Due to this, hackerspaces are especially found off open source and creative commons. What is not surprising since they are all gift economies and derive from the same culture.

MAKER SOCIETY

We live in a consumer society where the need to buy new things is all around us. Companies carefully plan ways to encourage consumers to buy new products, even when the old ones are still fully functional, in what became known as planned obsolescence. Consumption patterns are increasingly part of the way people perceive themselves (Featherstone 2007).

But not so much in hackerspaces. Karin Kosina (2009) of Metalab, one of the most well-know European hackerspaces, says that Hackerspaces are saying to the world “Stop being a consumer! Start to be a creator!”

D.I.Y. (do-it-yourself) culture is deeply rooted in hackerspaces. Why buy something when you can make it? But many times the motivation to make something is not financial. As Karin Kosina (2009) states “there is an incredible joy in building something with your own hands, of saying, 'I made this', and unfortunately most people in our society today have forgotten it, have never had it, and we want to give this back to the world”. To make something instead of buying it gives the creator a sense of accomplishment, increased confidence and power.

At the same time open source digital fabrication projects, such as the RepRap or the Makerbot (born in NYC Resistor, and extremely popular in hackerspaces), which allow people to print real plastic objects based on designs they can make on a computer, changes the relationship between production and consumption.

To re-use old hardware is common in hackerspaces too. Hackerspaces receive and seek computers, controllers, synthesizers, electronic equipment, among other things, which individuals, businesses and universities no longer use. When the equipment is still functional, it can be used for their initial function, when they are impossible to fix, they are dismantled and become a source of raw material for new projects.

To re-use and re-purpose is crucial to have a working knowledge, it's necessary to understand how something really works. This need to know, this insatiable curiosity is crucial in defining what a hacker is, as Bre Pettis, founder of NYC Resistor, puts it, “...we break things to understand how they work, share whatever we've learned and make stuff with whatever we can find.” (Schneeweisz 2009).

It's necessary to keep in mind that hackers work primarily with technology, and that technology is one of the more important motors behind human development. About this, Jens Ohlig, famous for the Design Patterns for Hackerspaces, says "is a very radical thing to take technology and use it in a way that is utterly non-economic (...) take the thing that may shape our future out of the economic sphere and control it" (Schneeweisz 2009).

This perspective of re-use, of production for self consumption, of being aware of the importance of controlling the technologies that shape our future does not fit well with the capitalist system, and companies would like to keep people in the state of eternal and passive consumption. Their profits depend on it. That's why they create restrictions, such as seals, to prevent products from being opened, studied and improved. And hackers just hate that.

EDUCATION

This is a field where hackerspaces are especially seen as innovative and as potential contributors to the discussion of future improvements. With the traditional model of education under attack, for not being able to teach what's necessary to succeed in the modern world, hackerspaces with their informal structure seem at least a good complement.

There are several ways people learn in hackerspaces, like workshops, lectures and presentations, but also by collaborating with each other and researching.

Hackerspaces present a learning model that is based on peer-learning and in project-based learning. Members of hackerspaces learn from each other in a horizontal format, where today one teaches and tomorrow one learns.

Also in hackerspaces people learn by doing, usually in a context of a project they want to do. This approach has a specific advantage because one does not only learn something, but learns how to learn.

To be in a place where knowledge is valued, where knowledge is applied, where people feel good about learning, sharing, collaborating, researching and making things is the most decisive factor in creating the right atmosphere for personal development.

With these examples, and more could be presented, what we tried to do was to show the contribution made by hackerspaces to the cultural discourse. These are just some of the issues and we can see that they apply to many fields.

There is a way of seeing the modern world that resists the dominant models. Many people are unaware of these alternative ways of thinking and doing. In hackerspaces there is a critical view of the economy, society, education, among other things.

We can say that, essentially, there is a understanding of what is to be human in the contemporary world. The hackers themselves are aware of this, Karin Kosina (2009) puts it this way "Hackerspaces are physical places for people to get together and tinker with technology, to learn new skills, to share their knowledge, to explore new ways of living together as a society. This is what being human is ultimately all about, creating knowledge and sharing knowledge."

This is what we consider to be an attempt to rewrite the cultural discourse through practice, through a living example.

Conclusion

Hacker culture is alive and well in hackerspaces. We know that many aspects of this culture are not new. The novelty, here, is that hackerspaces are expanding the influence of this culture through open and public spaces that are not cut from mainstream culture. And they keep growing all around us.

We have seen that the values and practices of hackerspaces show that their members have, in a more or less conscious way, critical insights into the functioning of society, economy and education. This vision is not expressed through participation in political parties or movements but rather by creating spaces where this vision can be realized.

These spaces are not closed structures, hidden, constructed to perpetuate the purity of their values. They are, on the contrary, open structures in contact and constant dialogue with society. This makes the values and practices of hackerspaces known and available to society, showing that there are still alternatives to the dominant cultural discourse.

This is the way that hackerspaces resist. The extent to which this form of cultural resistance is more effective than political activism is something that can be put into question. The way we may judge their effect is through engaging topics like the future of education, intellectual property rights, consumer society, new forms of political participation. These are questions in which the experience of hackerspaces can be used to shed a different light on the subject. But for that to happen further research on hackerspaces has to be done.

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The third skin – a medium or a mess(age)?

Eckehart Loidolt

Starting with samples derived from the history of architecture illustrating the key topics of buildings as 'the third skin' of mankind the presentation then jumps into main several questions for building envelopes such as protection, function, energy and meaning, facing several different contexts of today.

Opening a second stream of arguments, the statement dives into the wide field of 'architecture parlante' elaborating on sense or non-sense of narrative elements in architecture by balancing out their pros and cons. Ever since buildings have been experienced by passers-by through their façades which are physically defining public space, their genuine expression has been an important issue, though it has not always been treated carefully enough.

After bare Modernism and exuberant Postmodernism new tools and materials were entering the domain of building expression. Leaving aside the glittering world of commercial advertisement as well as the 'night-beauties' illuminated by artificial light when electricity entered the cities in the last century new forms of building-related, adoptive media communication get illustrated.

Looking at the exciting allures of present media-façades the inevitable question of content is introduced and exploited. Are we able yet to talk about new and reliable models of social interaction defining a media space or do we only face a variety of electronic attractions blurring the meaning of public space?

Pointing out durability and beauty as key issues for the longevity and life-span of building solutions the glittering media appearance in architecture is reflected upon critically. In this context the wide range of moveable functional parts in building envelopes researched on and gathered into the 'Move'-book at Prof. Michael Schumacher's department at the Leibniz University in Hannover (D) is illustrated as genuine means of today's architecture.

AESTHETIC AGENTS: EXPERIMENTS IN SWARM PAINTING

Justin Love, Philippe Pasquier, Brian Wyvill, Steve Gibson & George Tzanetakis

We introduce a swarm-based multi-agent system that produces expressive imagery through the use of multiple digital images. At birth, agents in our system are assigned a digital image that represents their *aesthetic ideal*. When groups of agents with different aesthetic ideals occupy the same canvas, a new image emerges through the convergence of their conflicting aesthetic goals.

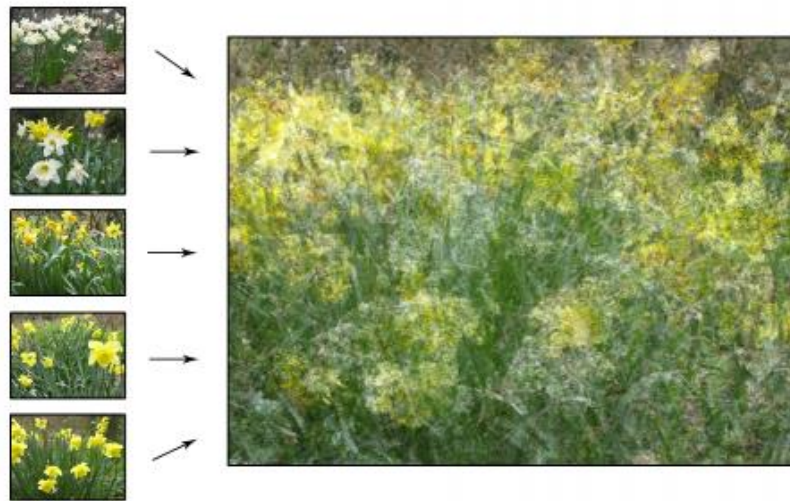


Fig. 1. 'Aesthetic ideals' (left images) for five different groups of Aesthetic Agents and the output (right image) their interaction produces.



Fig. 2. Examples of (a) Montage, (b) Cubist, (c) Futurist, and (d) Abstract Expressionist inspired swarm paintings.

Background

Our system uses autonomous agents to model swarm intelligence for the purpose of non-photorealistic rendering – a category of research we will refer to as Swarm Painting.

NON-PHOTOREALISTIC RENDERING (NPR)

Where traditional computer graphics has focused on photorealism, NPR looks to artistic styles such as painting, drawing, animated cartoons, and technical illustration as inspiration. In addition to its expressive qualities, NPR can offer more effective means of communication than photorealism by adopting techniques long used by artists e.g. emphasizing important details and omitting extraneous ones. [1]

AUTONOMOUS AGENTS

An agent can be defined as “anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors.” [2] An autonomous agent is an agent that can operate independently and is capable of controlling its actions and internal state. Agents can be grouped into two general categories: cognitive agents and reactive agents.

Cognitive agents have an explicit symbolic understanding of their environment and can be seen as an extension of symbolic AI techniques. An example of a cognitive or intentional model is BDI-architecture. In a BDI-based model the beliefs, desires, and intentions of an agent forms the basis of their reasoning process. [3]

Reactive agents are specified by their behaviour i.e. how they react to perceived stimuli in their environment. In a reactive agent model, rules map perceived input to effectual output that is generally executed immediately. Purely reactive agents have no internal history or long term plans, but choose their next action solely upon the current perceived situation.

Each model has its advantages: cognitive models provide more powerful and general methods for problem solving; reactive models are faster and capable of producing complex emergent behaviour from simple sets of rules. [4]

SWARM INTELLIGENCE

Individually, social insects such as ants and termites appear to behave in a simple, almost random fashion. However, when a colony’s collective behaviour is examined complex and seemingly intelligent global behaviours emerge. Initially, it was assumed that the insects were either communicating in an undiscovered fashion or that each individual had some kind of internal representation of a global plan. However, research in the biological sciences has determined that the behaviour is in fact the result of individuals working autonomously with only local information. [5]

One way that collective intelligence can emerge is through stigmergic interaction. Stigmergic interaction refers to spontaneous, indirect coordination between individuals that occurs when the effect of an individual on the environment can influence the actions of others. [6] An example of this is the pheromone

trail that an ant creates on the way back to the nest after it has found food. The pheromone trail attracts other ants who reinforce the trail with their own pheromones. Pheromones fade over time so once a food source is exhausted the trail to it disappears. This seemingly simple heuristic is so effective that it has been utilized to solve a number of combinatorial optimization (CO) problems, including the well known traveling salesman problem.

Swarm-based algorithms have a number of properties that make them successful at solving certain types of problems. They are versatile – the same algorithm can be applied with minimal changes to solve similar problems, robust – they keep functioning when parts are locally damaged, and population-based – positive feedback leads to autocatalytic or ‘snowball’ effects. [7]

SWARM PAINTING

Swarm Painting refers to swarm-based multi-agent systems in which a group of software- or hardware-based ‘painter agents’ move and deposit paint or change pixel colour values on a real or digital canvas. Swarm painting can be divided into two main categories: colour-based swarm painting and image-based swarm painting.

Colour-based

To date the majority of Swarm Painting systems have adopted a colour-based painting approach. In a colour-based approach, agents paint a blank digital canvas with pre-determined or randomly chosen colours. The majority of colour-based swarm painting researchers utilize an ‘ant and pheromone’ model. In this model, a colony of virtual ants move and deposit paint on a canvas based on the distribution of virtual pheromones.

Image-based

Another approach to swarm painting is to use an existing digital image as a reference for painting. The use of image files for NPR is a subfield within NPR called non-photorealistic rendering from photographs (NPRP).

The concept of using a digital image as a habitat for a colony of virtual ants was first published by Ramos at the 2nd International Workshop on Ant Algorithms (ANTS 2000). [8] In Ramos’ model, the grey level intensity of pixels in a digital image creates a pheromone map that virtual ants are attracted to. Ants deposit paint as they move and the trails they leave form a sketch-like image that contains salient features of the original image. Ramos’ primary interest was in image processing and not the creation of artistic works. In fact, the majority of research utilizing digital images as a habitat for swarm-based multi-agent systems has been concerned with non-artistic image processing tasks such as image segmentation, feature extraction, and pattern recognition.

Aesthetic Agents

Our system expands on previous research by using multiple images in conjunction with a swarm-based MAS for NPRP. Although our system references digital images for colour information it does not treat them as a habitat or environment. Instead, agents in our system are assigned a digital image that represents their aesthetic ideal. Accordingly, we refer to them as Aesthetic Agents.

On the surface, the behaviour of Aesthetic Agents does not seem to be stigmergic since the aesthetic ideal that agents are assigned can be seen as a global goal. However, the existence of multiple competing global plans produces images that are not the goal of any individual agent. Therefore, images produced by our system are the emergent result of local interactions since agents are not aware of each others goals or the image that will result from their interactions.

Aesthetic Agents are born in a toroidal digital canvas i.e. a 32-bit ARGB (Alpha Red Green Blue) bitmap image. Agents occupy a single pixel within the digital canvas and are invisible i.e. only their effect on the digital canvas is seen. When an agent is born it is assigned a 32-bit ARGB bitmap image that represents its aesthetic ideal. Aesthetic Agents are both reactive and autonomous. They are capable of ‘sensing’ the colour value of the pixel they occupy and those immediately surrounding them (Moore’s Neighbourhood) and can modify the value of the pixel they occupy.

Agents modify pixels through the interpolation of the RGB components in the pixel they occupy in the digital canvas $c(x, y)$ with the pixel at the same location in the agent’s aesthetic ideal $i(x, y)$. The amount of interpolation is based on a preset interpolation variable between the value 0.0 and 1.0 where 0.0 is equal to the first number, 0.1 is very near the first number, 0.5 is half-way between, etc. For example, if the interpolation variable is 0.1 (10%), the RGB colour value at $c(x, y)$ is (0, 0, 0) and the RGB value at $i(x, y)$ is (100, 50, 200) then the pixel at $c(x, y)$ will be changed to (10, 5, 20) by the agent.

To initialize our system we create n agents, where n is the number of input images, and assign each agent one of the images as its aesthetic ideal. Only one agent for each aesthetic ideal is required since the offspring of agents are assigned the same aesthetic ideal as their parent. In our experiments we spawned our initial agents either in the centre of the digital canvas, $c(\text{width}/2, \text{height}/2)$, or at random locations $c(\text{random}(\text{width}), \text{random}(\text{height}))$. For each iteration of the system, agents perform the following actions: Sense Colour & Move, Express Aesthetic Ideal (Modify Pixel) and Reproduce.

Experiments in Swarm Painting

We used our system to explore a number of concepts and techniques from a number of Modern Art Movements.

MONTAGE

Since our system uses multiple images the most obvious visual technique to explore was montage. Montage (French for ‘putting together’) is a composition made up of multiple images. The technique played an important role in many Modern Art movements including Bauhaus, Dada, Constructivism, Surrealism, and Pop Art. To create a montage we simply take n images and assign each one to a different group of Aesthetic Agents. *Figure 2(a)* shows a montage made of an image of a skull, a lotus flower, and dice.

IMPRESSIONISM

Impressionism was a late 19th century art movement based on the work of a group of mostly Paris-based artists including Monet, Pissarro, Manet, Sisley, and Renoir. Some of the characteristics of Impressionist paintings include small, visible brush strokes, an emphasis on light and colour over line, a focus

on the overall visual effect instead of details, and a relaxed boundary between the subject and background. To explore these techniques we set different pictures of the same subject matter as the aesthetic ideals to different groups of Aesthetic Agents. Our intention was to try to combine similar elements of the same subject matter into an abstracted form. *Figure 1* shows an example in which five groups of agents are given five different images of daffodils.

CUBISM

Cubism was an art movement in the early 20th century pioneered by Picasso and Braque. In Cubist artworks subjects are deconstructed and re-assembled in an abstracted form that often depict the subject from a multitude of viewpoints. To explore this technique we took photographs of the same subject from different angles and assigned the different perspectives as aesthetic ideals to different groups of Aesthetic Agents. *Figure 2(b)* shows the result of this technique and the increasingly abstract effect created as more angles and images are added.

FUTURISM

Futurism was an artistic and social movement founded in Italy in the early 20th century by Filippo Tommaso Marinetti. The Futurists admired speed, technology, youth and violence, the car, the airplane and the industrial city – all that represented the technological triumph of humanity over nature. To the Futurists we lived in a world of constant motion, an idea that manifested in their painting manifesto:

On account of the persistency of an image upon the retina, moving objects constantly multiply themselves; their form changes like rapid vibrations, in their mad career. Thus a running horse has not four legs, but twenty, and their movements are triangular.

To explore this Futurist concept we took successive images of a subject in motion and set the images as the aesthetic ideals for different groups of Aesthetic Agents. See *Figure 2(c)* for an example of this technique.

ABSTRACT EXPRESSIONISM

Abstract Expressionism was a post-World War II art movement that is characterized by spontaneity, emotional intensity, and an anti-figurative abstract aesthetic. It was the first American movement to achieve global influence and was largely responsible for shifting the centre of the Western art world from Paris to New York City. Some notable painters of this style include: Jackson Pollock, Willem de Kooning, Mark Tobey, Mark Rothko, and Barnett Newman. Since we had discovered that increasing the number of competing aesthetic ideals in our system leads to increased abstraction we simply needed to use more images to create completely abstracted imagery. We found in general that around ten images is sufficient to remove all of the figurative details from a set of input images. *Figure 2(d)* shows an abstracted image made by assigning ten different images of a reclining nude figure to ten different groups of aesthetic agents.

The above examples demonstrate the importance of image selection to achieve a particular effect with

our system. Although, some of the effects (e.g. Abstract Expressionism) can create interesting results from random image input, others like Montage require more mindful selection to achieve good results e.g. have figurative elements remain intact and still readable.

Conclusions and Future Work

In this paper we expanded upon previous research that utilized swarm-based multi-agent systems for NPRP through our use of multiple images. We successfully implemented a system that is easy to implement, versatile, and capable of producing novel, high quality artistic renderings. In doing so we demonstrated the power of biologically inspired models and metaphors to create new forms of artist expression. Furthermore, the simple implementation and effective results produced by our system makes a compelling argument for more research using swarm-based multi-agent systems for non-photorealistic rendering.

We created our system using a swarm-based MAS, but we are certain that similar results could be produced using another programming methodology. Which begs the question, why use a swarm-based MAS methodology? To answer this we will adopt McCarthy's justification of intentional systems that "although a certain approach may not be required – it can be useful when it helps us to understand and think about systems where a mechanistic explanation is difficult or impossible". As computer systems become increasingly complex we will need more powerful abstractions and metaphors to explain their operation. This is particularly true in the case of modelling emergent phenomenon.

The dynamic nature of our swarm painting system makes it easily extensible to interactive applications. At the time of this writing we are working on a series of interactive installations in which agents are born and populations dynamically change based on input from real-world physical sensors.

In the future we would like to endow our agents with more more biologically inspired attributes and behaviours. More complex movement, feeding, and reproduction strategies will be investigated. In addition, we can extend our current model of an 'aesthetic ideal' to go beyond the colour values of pixels in a target image. Future agent's aesthetic ideal could be based on other visual elements such as contrast, brightness, and saturation or an agent could have a geometric bias towards creating certain shapes. To explore our system we used a number of Modern Art movements as inspiration for our experiments. Future work will explore the innate and unique qualities of our system. Finally, we would like to create Aesthetic Agents that inhabit a 3D world. Groups of agents could be given different 3D models as their aesthetic ideal to create emergent sculptures. Other Aesthetic Agents could add living textures to the 3D forms.

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UBICOMPUTACIONAL ART: URBAN ENVIRONMENT AND EMERGENT NARRATIVES

TIAGO LUCENA

This paper explores the art in Post Desktop Era and we propose the term Ubicomputational Art with a new field in Cyberarts for study of junction between Art + ubiquitous computing. The ability of urban environments to add information is also exploited in the art in some collaborative practices. We intend showing some mob applications created like an artwork that allow the user tell stories about place in a new open narrative porpoise.

// UBIQUITOUS LIFE CREATING ONE UBICOMPUTACIONAL ART.

Mobile computing, pervasive and ubiquitous computing are the phases that computing platforms are suffering and will change the how we perceive, share and create information.

The ability of urban environments to add information is exploited in the art in some collaborative practices how construction of maps, mobilization (flash mobs) and interventions in virtual metropolis. We started our journey between this relations: city/mobile technologies by participating in some Collaborative Cartographies, flash mobs and wireless or mobile games or location-based games. All these categories use the technical infrastructure of computer and social networks at the intersection of space virtual and physical. In this field of research, we include our interesting to emergent narratives topics remapping the space of the city by adding new layers of data/information.

This research growing up a new collaborative space of LART _ Art and Technoscience Laboratory (coordinate by Dra. Diana Domingues) in intersection between Art and Software Engineering, Automotive, Eletronic, Energy at Universidade de Brasília/ Gama campus. A new space opened at Gama Campus where engineers works together artists in a transdisciplinary methodology pointed by Ivan Domingues, philosopher (2005).

The research about cities environments and arts started in the topic of Arts plus ubiquitous computing systems. We propose the term of Ubicomputacional Art, with a new Field in cyberarts for study of junction between Art + ubiquitous computing. The term of "ubiquitous computing" was proposed by scientist Mark Weiser, in 1991, to designate a profound change in computing platforms. These changes inaugurate other models of computing, where computers are effectively integrated into the environments in all daily practices beyond the uses and behaviors desktop metaphors machines. Weiser used the word ubiquitous, (which means something that is or can be in everywhere, omnipresent) to describe a kind of "computing without computers" (WEISER, 1995). "In his telling, desktop machines per se would largely disappear, as the tiny, cheap microprocessors that powered them faded into the built environment. But computation would flourish, becoming intimately intertwined with the stuff of everyday life" (GREEN-FIELD, 2006, p. 11).

The Ubicomp dawning as a phenomenon in informatics researches e undoubtedly will bring changes in how we deal with things day by day. The data contained in virtualized and Cloud Computing, the mobility of wireless devices and interconnections between things through a structure many networks are

other important features such research and have been observed by us in studies concerning the Mobile Art and the Locative Media Arts (Lucena, 2009). We continue this research, raising the possibility that the matter now in the Art Ubicomputational is not only the "mobility" (as it exists in events before the creation of cell phone and its appropriation in art), or wireless connection equipment (laptop, mobile, palm tops) as we suggested before, but the "invisibility" of them. For Weiser "Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single box. By analogy with writing, carrying a super laptop is like owning just one very important book". (1991, p.20). Thus, we approached the Ubiquitous Computing to understand a new art form that rearranges the forms of connection, access to information and the concepts of portability and mobility.

We believe that with these new computing platforms (which includes transparent interfaces, mobile and portable devices, sentient objects and tangible bits) inaugurates a new phase of art. The term Ubicomputational Art is not just the sum of art with ubiquitous systems but also a new mode that is born and a new paradigm for thinking about the relation of art, science and technology.

//ARTS + COMPUTERS

The uses of computational platforms in arts is contemporary with the emergence of electronic computers in the 1950s. The Brazilian artist, Waldemar Cordeiro, was one of the pioneers in this kind of art. The computational art works with computational algorithms, which are commands given by the developers to machines that perform the calculations. These productions sought to exploit the potential in the creation of worlds and synthetic images, the possibility of interaction (at different levels of man-machine), the contacts and dialogues established through human-machine interfaces.

The creative process of creation in Computational Art found himself constantly linked with the arrival of graphic interfaces, which somehow facilitated the work of the artist. The tools of the computer have opened new kinds of art works and share these works for people using networks. The digitization of data, display screens and the ability to interact with them have added significant changes in the artistic process. We are in diverse experiences, accompanied by persons connected away from us, due in large part, interfaces and technological mediations that put us in the same (cyber)space. In this perspective we followed many telepresence, remote actions and at distance art practices. Indeed with the arising of telematic infrastructure the artists trying to connect the so long places as possible. Now, the artists are looking to the space of connection opened by mobile phones, notebooks and other portable devices to see something and tell about places near where they are.

With the artistic practices that use the ubiquitous computing, it has been clarified so that the means of production change significantly the results of the stylistic art. We propose a look at these events and artistic products, emphasizing the elements that differ from the Computer Art or Code Art. Anyway we have to propose new theories to explain this production in contemporary art. Then follow the directions of Manovich (2001), that to understand the logic behind the new media came of Computer Science.

For us, this new platforms for interaction between man-man and man-machines, has opened new practices of creation in art using the potential of collaborative works in virtual networks.

// BEYOND THE MOBILITY

The use of cell phones in every daily practices is reconfigure our daily experience, putting us in constant contact with friends, family and work's topics. The fact that we can be

connected with everyone, anywhere and hours (not to mention the places where the systems telecommunications cover), makes it possible for us different ways of organizing everyday life. The relations characterized by the ubiquitous network grows in spheres of family, social relationships, work, social services, entertainment, based on selective network (Castells, Qiu; Ardevol and SEY, 2007, p. 126).

The cell phone is today the best example to illustrate how computers came to desk to habit our pockets. This movement is important to create the good conditions for ubiquitous computing in a pervasive world. We believe that mobile phones will act as the remote-control of the others objects placed in our homes, in a dialogue between machines. With the m2m communication, Humans will also interact, consciently or inconsciently, with a data space around us, machines will transfer information. "Cyber-space is in everywhere" said William Gibson (2007).

Apparently invisible, computers are "populating" the homes, offices, streets in smart environments, pockets and in many other portable technologies. Reserved in rooms in 50s, computers today keep the relation: many computers for one person. Now the computer and the room are the same thing.

In dealing with the computer in the Post-desktop Era will not do so only through the manipulation of data through the screens of monitors. The mouse and keyboard still stand between man and machine. In Ubicomp, computing will become so intuitive and transparent that its interface will deal with data without having the awareness of such action. The computer "disappear" and goes to the "peripheries".

Weiser points out that the disappearance is a fundamental consequence not only of technology but also of human psychology. When we look at a street, the author quotes, information just evil deeds "without consciously performing the act of reading." This feature has been called various names (compiling, tacit dimension, visual invariants, horizon and ready-to-hand) by computer scientists, psychologists and philosophers. We prefer to use the term of John Seely Brown of PARC that calls such as the quality of being in the "periphery".

Works in art, that work in these lines of investigation illustrated by Rheingold (2002) could be also include as expoents of Ubicomputacional Art, :

1. Information in places;
2. Smart Room: ambient that feel the presence of the person and answer for it;
3. Digital Cities: urban places are able to add digital information in places to help people to walk, to access information about places, services, new practices of e-government, m-government;
4. Sentient Objects: add information and communication ability in physical objects;
5. Tangible Bits: manipulating virtual world by physical objects and
6. Wearable Computing.

The ability of urban environments to add information is exploited in the art in some collaborative practices how construction of maps, mobilization (flash mobs) and interventions in virtual metropolis. Collaborative Cartographies, flash mobs and wireless or mobile games or location-based games use the technical infrastructure of computer and social networks at the intersection of space virtual and physical. In

this field of research, we include our interesting to emergent narratives topics and the concept of the Urban Mixed Realities worked by Rod McCall (2008) and his group.

The readings on the relationship, between physical and virtual space, is also important the concept of Cybrid (Hybrid + cyberspace), proposed by architect Peter Anders (1999). We follow Diana Domingues (2008, p. 6) when she says that the "qualities the environment using a mix of computers and interfaces that take action in co-existing in space and material digital space, in physical space and data space. "For us, the focus of the research of artists and scientists in the ubiquitous world is in the mix of technologies to places. These include so many devices cell phones, palm, notebook computers) and vehicles (SMS, GPS, MMS, e-mail) "that are no longer limited to rooms and offices with fixed equipment, put the computer the periphery by the possibility of locate and to be located. Are the mobile and locative technologies that alter sense of place, time, space "(p. 5).

As background to our work we can localize some location-based games and wireless mobile games. The proposal to link to content in places began deposed our interest in investigating other examples in history of the arts. It read in this relationship between art and the city the work of international Situationists and various other interventions / performances that call poetically attention to the places.

// THE MOB APPLICATION: TAKING THE URBAN SPACE AS A SHARED SPACE FOR PEOPLE TELL STORIES

The user-generated content is configured as a trend in the use of digital communications technologies and information. There are several sites, computational tools and platforms that allow users to create, share and comment on content created by other users.

The participation reaches high levels with the incorporation of mobile phones the computer network. Armed with mobile devices, which can be compared to laptops, people have the sense of presence and enhanced participation by means of tools that allow you to upload any content to the cyberspace from anywhere. The mass self communication (Castells, 2006) are the concept related to production decentralized, and no generalized "mediators."

No less interesting was followed by the incorporation of art and media that also allow the viewer's participation in the process of artistic enjoyment. Something that had already been appointed from a participatory art movement, with various demonstrations that used sensors, cameras and objects to the viewer to touch, feel the art-experience. The interactive art, opened especially after the use of computational resources from the 60's, puts the viewer and the work as a spectator to participate in building the image, the creation of audio effects in a variety of experiences and conditions: multimedia installations, webart, gameart among others. With the rise of cellular proposes a kind of Art in Mobile Media, which has received other names as Mobile Art and Art in locative media. More precisely in the use of mobile devices, many of these demonstrations did not invite the viewer to only trigger pre-recorded images and sounds, but to send images and sounds created by themselves providing geolocated data, being "followed" and "follow" other users in finding information.

Relations characterized by the ubiquitous network are given in the spheres of family, social relationships, work, social services, entertainment, based on selective network (Castells, Qiu; Ardevol and SEY, 2007, p. 126). In art, think about the marriage between participation of users sharing experiences and experiences with the constant connection and mobile afforded by telematic networks. Thus, the aim of

this report is to present the process of creating a mobile application called AQI!. The Project Emergents Narratives in Urban Mixed Life: Creating computing platform (mobile app + site) to create / count stories about cities was born of questions and seeks to participation and interaction of users in generating subjective content for mobile interfaces and tools that facilitate sharing information. It has as its central objective the construction of a platform, composed of mobile application AQI! plus site, for individuals to create, share and visualize stories. A geolocated story where the user lives. The project is open to the creative use of stories and lets users fiction are also created. They are user-generated content in ownership of tools that can be exploited in building social communities and networks. The stories are visible encouraging participation and collaboration with another user. The content published may be text, image or video.

The mobile application AQI!, developed as part of this project was built on the Android platform in the Java language and uses the Google Maps Android API, which displays the same geolocated data displayed on the website. The design is user-centered, to create a comfortable interface for any operator (Saffer, 2010). The data are retrieved in XML and HTML server using HTTP. The application also lets you send data directly to the server. By surfing on the Web, other users can participate using the website created to access and creation of content. The website was developed in PHP and JavaScript, using Apache webserver and PostgreSQL as the database manager. In addition to providing the public information about the project, enables the visualization of geolocated data by Google Maps API and provides an interface to these data for use in mobile app.

This creation of "worlds counted" and stories that encompass the context and the use of mobile phones to tell stories, tries to generate narratives by people in diverse locations, furniture, has as reference "Free the Monsters of Manchester." The project consists of a "campaign political action" by the monsters who lived in the area covered by the City of Manchester long ago, in the industrial revolution but are now "Trapped beneath the tall buildings made of bricks and stones and cement." Manchester residents are invited to take part in the campaign, choosing a place in Manchester, wondering what kind of monster would ever have lived there, and putting the monster in place using the system Anywhereblogs. Users are reminded that: "Monsters are released as soon as you conjure" (Wilson and Hales, 2008). Once a monster is imagined and written about He was found by the people, then it exists and is as real as any part of Manchester. The monsters released are tagged on Google Maps.

In the spatial movements of mobile phones across the cities realizes that the connectivity of the device itself replaces the stereotype of the Internet connected to the PC front, sedentary at home. Some examples in mobile art the displacement of virtual character is only performed with an equivalent shift in space physical performed by the user / player. So these games do not even require only physical movement of the players they are also tools to meet people, make eye contact with others and the appropriation of examples urban fabric as a board.

The same principle is proposed in the AQI! the creative use of GPS, which allows the application accurately identifies the approximate location where it is found. Thus, when designing narratives in the urban environment, to enable urban environments to make available information. The use of virtual maps and geo-located platforms (GPS) allow become "discoverable" the viewer and creator of the narrative. In addition, another important precedent was with the workshop given in the city of Passo Fundo - RS, called Narrative cybrids, mobility technologies and urban life mixed coordinated by Diana Domingues. Where workshop instructors were allowed to think and create stories that emerged in the exchange of SMS, MMS walks in the streets and in meetings with local residents and city in the

State. An interesting quality of the AQI! is given the possibility that people can, and create stories, report the problems of their city, dissemination on the world wide web and collaborating with others in the construction stories. AQI is one mobile application for Android based devices versions 1.6 or higher. Models equipped with GPS and compass. Connected to Internet through the network 3G or wireless plans. It is intended for any user interested in share some event of his life in a particular location or create a story about a particular place, showing new possibilities to the relation between urban spaces and opened narratives. Users can create their stories through the use of the web, and from the phone itself. Stories are shared and open to collaboration with other users. In addition, anyone can comment, quote and build together with others in a process collaborative writing stories.

Integrating arts experiences and biomedic engineering at Brasilia University, acting in LART we proposed the collaborative project called CidadePathia (something like Pathos of the City). This conceptual project will be a intelligent system in u-health (ubiquitous health) that select some biological data from citizens from Brasilia. The system select some data from users using biomedical sensors and mobile phones, this information will be upload to one map that allow people, urbanists and health professionals to see where and when some diseases appear. Of course, combining some of these biomedical data we can know if the citizens are stress, calm or having heartbreaks. For now, is just one project that follow the ideas from AQI! In this kind of integration between intimate or documental stories with urban space.

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Fig 3. Dance position with dance notation (Benesh)

Humans have a unique ability to build formal languages. We use them to both communicate among us, but also to communicate with the machines we assemble. Computer programming languages and natural languages are both formal languages. Nonetheless they stay at the antipodes: one is close to our anthropological way of communicating and the other is close to how the inner machine logic works. But, they both instantly establish an understandable abstract environment to describe processes. Their point of contact is centered in the way we're able to write programming language code closer to our natural language (English is the universally adopted one) transversally modifying the way we formulate what we'd like the machine to do, and so generating a significant output. This formulation is a hybrid territory where pure language, explicit dynamic structures and simple to complex formulas collide. Loops, cycles that run depending on value-driven decisions are outputting computed meanings. Words and numbers, meaningfully sequenced are directing the formation of a text, a drawing, a picture, a sound, a movie, or a combination of all the above, with the programmer acting as an open scriptwriter and the user acting as a temporary director and spectator at the same time. These two actors (the programmer and the user) have an invisible and time-delayed relationship that is defined through the programming code, and the same code embodies the many adapted and twisted senses mutating the natural language. This is the territory where historically "software art" steps in. Playing with language and its power to generate impressive output thanks to its ability to use a readable formal language, that is potentially generating infinite sense (as the natural language does).

1. SOFTWARE ART, USING FORMAL LANGUAGES AS ART

Software art ancestors have been retrieved in the seventies, among the artists ascribed to the conceptual and performance art movements. And that now sounds quite plain to see, as they were art movements dealing with language at their core. Particularly "Draw a straight line and follow it" is one of the celebrated conceptual artworks by the composer La Monte Young. It's a small masterpiece as it can be seen as a music score, a piece of visual art, a poetic text, a performance. [1] "This piece can be called a seminal piece of software art because its instruction is formal" Florian Cramer and Ulrike Gabriel claimed in their seminal "Software Art" essay in 2001. [2] Technically it can be defined as a loop, more

precisely an infinite loop that generates a proper half-line, with a fixed origin and a straight direction with no end. It's a concept expressed in natural language, but it perfectly describes the structure of a typical computer programming loop (do something infinitely or until something else happens). Its endlessness has an intrinsic dynamic that is a peculiar software characteristic: dynamically designing a process and enabling the dynamics precisely generated by the software itself. The code becomes then a script infinitely variable as the natural language is. And code becomes a pure linguistic performance, in this perspective. In recent years artist Mary-Anne Breeze has epitomized this approach. She created the "mezangelle", a language composed with hybrid words (conceptually close to the portmanteau words invented by Lewis Carroll). [3] Moreover in mezangelle the words are not only condensed but they also recombine language, stacking multiple layers of meanings into single phrases. This is accomplished hybridizing formal code and informal speech into a condensed textual space (like, for example in "[vec]Tor[n]Space_[di]Stancing"). She cut forms, conventions, phonetic spelling, abbreviations and slang used in the internet culture at large and grafts them onto regular words in a still readable way. These alterations don't follow fixed syntactic or grammar rules but more a very coherent "style" that is instantly recognizable. The poetry and the discourse she composes are an ever changing morphological synthesis of different formal languages into a variable one that embodies the tremendous potential and dynamism of them combined in a different way every time she writes a new text. That's why the initial dilemma of how to categorize art made with software (involving telematic networks or not) has been generally solved sorting it as "performance," that meant to preserve its essential dynamism. In fact considering software as a performance means to acknowledge its linguistic properties, including having a beginning, (at least potentially) an end, and a process that goes on between the two. Moreover it means also to definitively recognize the strategic role of the instructional code and its literary gesture, involving scripting entities and events that form the process. The result is always formal, being it natural language, code or a hybrid one, but it's nevertheless written in a universal and unambiguous language.

2. DANCING CODE

Software can be then defined, with no doubts, as a dynamic process. It can describe an infinite type of processes in a formal language making the computer calculating the output, basing on some input. Now let's consider the dance practice as a process. Especially popular type of dance is often quite formalized through a recognizable code that anybody can follow. There are a few notation systems for describing dance, but none of them are acknowledged as a major standard, and universally acknowledged. The best known are the Labanotation and the Benesh Notation [4] and they use abstract symbols to specify the position of body parts, their direction and the speed of movements. Every notation system has developed its own array of symbols and syntax to generate a shared formal language to express the "set of postural and motion rules to define how the execution of the movement is to be applied." [5] The finite sequences of these symbols are describing an animated sequence of a body performing a choreography with its own embedded narrative. Here the space, where the body is moving, has to be precisely described and the used codes are rendering the space's different peculiarities in a symbolic way. Nevertheless the whole sequence of a notated choreography is a code that functions in a very similar way a software program does. It needs the body as the input and it generates an output of a whole animation of movements in space. Dance is then animating the body through a code and it expresses the smoothness of transition between the start and the end of an event, with all the dynamics in between. Seen through an anthropological perspective, the "code" of dancing practices (feet and body positions, and the sequence of movements) has been historically spread through an oral tradition that in the 20th century has eventually become viral. The description of entities and their movements has been assumed to be learnt by heart (almost in its literal sense), to be then stored and transmitted

eventually with variations. It has been a social process with dynamics similar to what FLOSS (free/libre/open source software) programming is nowadays: acquiring a code, using it, eventually modifying it and vastly sharing it. So it'd not be any accident if computer programming, FLOSS, dancing and social aspects would collide in some ways.

3. PROGRAMMING ANIMATION IS A WRITING (MOVING) PROCESS

So can we consider "computer animation" (the process of programming the movement of different objects on the screen) a form of choreography? Probably yes. Programming animation on a screen is definitely similar to notating or coding a dance choreography. Nonetheless in computer animation the human body is abstracted into any kind of programmable forms, and the space is a virtual three-dimensional one, visualized in the two-dimensional screen. Computer animation can be then considered as an "abstracted dance", since the principles of movement in space remain the same, generally including the physical law we obey to in physical reality. But it retains some specific characteristics of "dance", for example being based on harmonic movements that are expressed through a timeline and strategically positioned in the virtual space, with a peculiar narrative. Beyond that, programming computer animation is an activity that implies some computer programming skills, or being able to describe processes in a computer language code. If historically it has been made in programming code that was very close to the machine logic, one of its major popular shifts has been accomplished in the nineties with the Adobe Shockwave [6] platform. Making animations in Shockwave (with the historical characteristic of being viewable for the first time within any web page through a standard plug-in) involved learning the script proprietary programming language called Lingo. [7] Despite that, a substantial wave of animations was produced in the first wave of the web, and for cd-rom supports as well. In the years two thousands the awareness of the FLOSS (free/libre/open source software) community produced new types of platforms, including openFrameworks, [8] founded by Zachary Lieberman, [9] that were able to move this coding practice to another level of social interaction. Lieberman noted that he spent his childhood in a printshop. That made him aware that a printing machine, indeed a powerful machine to produce content on a medium, is not something that can be easily owned by a single person, because is too expensive and definitively too heavy. It has to be eventually shared, capitalizing, both socially and economically, on the small community that can be formed around it. He learned as a kid that sharing content producing platforms and skills was the key to improve knowledge and produce beautiful products.

Lieberman engagement with computers and code led him to program animations, and teaching how to do that, in a peculiar way. He considers it a social process, more than a mere technical or educational one. That is evident in his personal research developed working with magicians, in order to help them integrate digital technologies in their public performances. Magic has different distinctive characteristics. It involves deception, because it involves distracting our attention and senses from what is being manipulated. There are also strict rules as, for example, that visual tricks are usually never unveiled, except among the practitioners. But magic involves fascination, and especially being in the mood to let ourselves be fascinated. Still magic is also something experienced in public, and it's an emotional experience. Once shared, it can be a terrific medium of communication for its perceptual involvement, and somehow it's already exploited in communication to wake up the spectator's attention. But again it is a language skill. And it means to share a common language. Once the people involved are comfortable with a language and a grammar they can communicate, collaborate, share and build systems together. Somehow that almost literally means to bring life to code. If anthropologically building machines that seem to be "live" means to us to construct something with its own moving autonomy, for our senses building a system that contains autonomous entities that follow their "code"

to act, is one of the closest situations where to consider that system as a "live" one. Generating this kind of artificial life is close to our instinct that pushes us to build sophisticated machines that resemble our behaviors. Programming code becomes then the esperanto for building autonomous systems that can rely on the beauty and "magic" of animated objects, unifying a small community around its efforts of creation and simulation of "systems."

4. PROGRAMMING LANGUAGES CAN BE SOCIAL INTERFACES

Language is our most used social interface, but under the proper condition, a programming language can be a social interface too. In the case of openFrameworks, the code, developed under proper FLOSS conditions, becomes social for various reasons. First it relies on an active community that supports it and guarantees its technical update and management. Moreover, when dealing with animation, it deals with an activity that can be "socially" processed as dance historically has been done. Finally quoting Lieberman "we're moving away from objects, we're building systems." The dynamic environments built in open platforms like openFrameworks are shared and constitute micro-worlds that include the internal relationship, as small virtual communities. The process of building them can reflect the social communities outside these environments and reflect them both in the functioning models applied and in building and sharing them through the developing community. There are interesting social consequences for these practices. One is how language (any hybrid one can make by computer code and natural language) can build dynamic social systems and compelling animations beyond enabling a simple communication. And another one, even more important, is the crucial awareness that a temporary or fixed community can build a system, sharing it and using it, or improving it at will. Designing systems collaboratively can then change the communication we usually use. Staying free under these conditions we can become a multitude of test beds on how we can change ourselves and our cultural neighborhood.

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THE FLUCTUATING BORDER BETWEEN ARCHITECTURE AND THE BODY IN SHIVER

Colleen Ludwig

Shiver is an immersive, interactive environment that uses physiological and psychological aspects of skin as visual metaphors and sensory mechanisms. The edge between body and space forms an ever-present, fluctuating borderland. My research on skin biology and the phenomenology of space results in a work that engages the body surface, activates the senses, and brings the body into direct relationship with its environment.

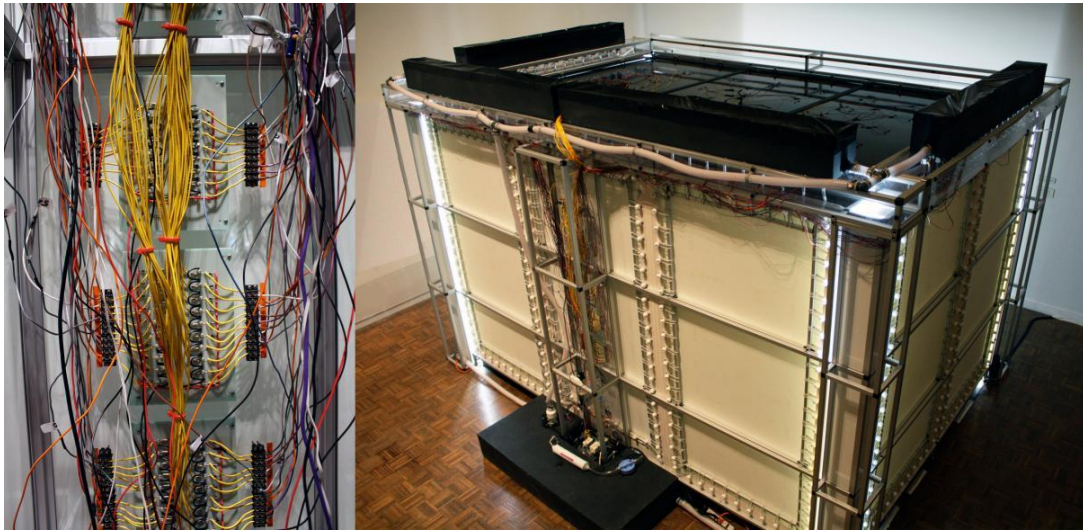


Fig 1. Shiver, exterior and detail, 2011, Colleen Ludwig, aluminum framework, fabric, plumbing, electronics and programming, 10' x 14' by 12.5'. Photographs by Colleen Ludwig.



Fig 2. Shiver, interior and detail, 2011, Colleen Ludwig, aluminum framework, fabric, plumbing, electronics and programming, 10' x 14' by 12.5'.

Shiver is an immersive, interactive environment, that integrates programming, electronics and a recirculating water system into a pre-fabricated, architectural framework with specially treated fabric walls. The resulting room is filled with cascading water flows, which develop organic patterns and conjure an impression of compassionate space. *Shiver* is a meditative place for mindful sensing of the body as it integrates itself into the surrounding environment. I created this artwork to poetically articulate the fluctuating border between architecture and the body. It is the first room in a series called *Elemental Bodies*. Each of these rooms set conditions which ask participants to experience their skin as a mediating border between viscera and atmosphere. [1]

Upon entering the artwork, visitors activate trickling flows of water. A sensor matrix in the ceiling tracks people as they explore the room. That data is used by microprocessor software to move the vertical water flows along the walls in response to a visitor's position. Individual streams naturally form curvy rivulets that cling to, and creep along, minor topographies in the water-resistant fabric walls. The patterns are similar to what is seen on wet human skin. Due to surface tension and capillary action, the flows bulge and contract slightly, giving them a shivering effect.

Groups of contiguous water streams form *nodes*, which grow from a central stream to widths of 3, 5, or 7 streams. Nodes get bigger as you approach a wall and smaller as you withdraw, creating the illusion of water emerging from, and receding into, the wall membrane. Multiple kinetic responses of the water flows in *Shiver* encourage participants to walk slowly and change vantage points, in order to cause the room to react in different ways. Although the exterior is heavily equipped with mechanical contraptions, the water formations enliven the interior space and bring primary focus to the organic. The effect can be both soothing and unnerving, as the beautiful, watery forms invade a space we expect to be dry and neutral. The invitation to touch the flows is implied, but not stated. This adds tension, as each viewer must weigh the desire to touch the water with possible unintended consequences, including wetness, surprises, altering the water paths or breaking the piece.

The physiological and psychological aspects of *skin* are used in *Shiver* as both visual metaphors and sensory mechanisms. Visitors are encouraged to examine their agency in constructing boundaries between themselves and their immediate environment. The space between a visitor's body and the room's skin is excited by the swelling, shrinking and shifting water flows. These changes shift people's perceptions of the scale, moisture and heaviness of the installation space. The title of the piece, *Shiver*, refers to skin response to light touch, air movement or close proximity to another living being. As visitors walk around the room, the rivulets are programmed to move symbiotically along the walls. A non-verbal conversation emerges, and the room itself appears to be highly empathetic. My desire is for viewers to return that perceived empathy through their movement in the space. This haptic feedback loop creates a sense of physical intimacy, within a space that functions as if it is a sentient organism.

In the *Elemental Bodies* series, my premise is that the edge between body and space forms a fluctuating borderland that is always present. The viscera of the physical body is encased by skin, but the senses extend the border of the corporeal self. This boundary varies in accord with physiological, psychological and environmental changes. Skin shields our interior workings and makes them mysterious, but also acts as a profound mediator between our inner and outer world. *Shiver* is meant to heighten awareness of such negotiation.

My perspective on skin has been reinforced by studying its biological and structural functions. These are described and analyzed in non-clinical language in *The Body's Edge: Our Cultural Obsession with Skin*,

written by pathologist Marc Lappé. [2] He compares our common perceptions to biological reality: “Until recently,” he says:

“we have tended to think of the skin as...a watertight covering that enfolds ourselves and our organs and keeps them separate from the world out there. We visualize the skin in purely Euclidian terms, as a two-dimensional sheet that envelops us in a kind of perpetual Saran Wrap. ...In actuality...the skin is a highly convoluted, vulnerable, three-dimensional landscape. [It] has valleys, ridges, and folds, much as does the earth’s surface. And, like the earth, it is shot through with pores, holes and channels that greatly increase its surface area and make it anything but a smooth, two-dimensional surface.” [3]

Lappé continues:

“The skin is actually designed to permit a constant flow of insensible [unmeasurable] water percolating upward from its deeper layers. ...This water resistance but not waterproofness of the skin is due to the coexistence of two different pathways. ...These pathways take the form of molecular sieves that interpenetrate the skin much as wormholes pass through ancient wood. ...These channels are positioned underneath the skin like the honeycomb of a beehive. This structure provides tiny interstices where...slightly salty water constantly percolates upward to the skin surface through the underlying dermis, much as a plant receives replenishment from its roots.” [4]

In the collection of clinical essays, *Biophysical Properties of the Skin*, author J.R. Kanagy opens his chapter on water absorption with a declaration: “The relation between water and skin is one of the most important phenomena of life on this earth.” [5] He explains that most body water is bound in gels of connective tissue and cell bodies. “Water is, in a sense, skeletal in that the physical properties of...tendon, ligament, bone and the tough connective-tissue structures...are altered very appreciably by both increases and decreases in this content of bound water.” [6] In an essay on electrical properties of skin from the same book, Dr. Robert Edelberg writes: “In addition to its role in thermoregulation and water-balance, the skin is also a tactile sensory organ, and its mechanical characteristics greatly influence the nature of the neural pattern which occurs where it makes contact with an object.” [7]

While *Shiver* doesn’t schematically represent skin, its architectural presence and water interactivity invite comparison to these biological descriptions. Lappé, Kanagy and Edelberg’s observations reveal a framework for skin that is architectural in nature and intrinsically linked to water. In *Shiver*, the structural and sensing systems are two physically integrated layers located outside and inside the wall membrane. In concert, they offer an experience of *ourselves-in-space* and construct a loose representation of sensing. The beautiful, refreshing presence of water in *Shiver* reflects Lappé’s assertion that: “Our sense of psychic well-being is inextricably linked with our skin.” [8]

Edelberg’s statement regarding touch evokes the use of our hands, but our primary touching experience is through the skin as a whole, by far the largest organ in our body. Skin pushes against the exterior world, touching air or clothing at every single point on our surface. Our skin’s contact with space is critical to forming our experience of space. Skin enables us to gauge the size and ambiance of the environment. It reveals details of our location through temperature, humidity, electrical charge and air movement. Skin sensing is a major component of the intuition mechanism, and helps us predict interactions with other living beings through subtle perception of factors such as heat, tension, fear, conductivity and health. Together with the eye, skin allows us to comprehend our surroundings without directly using our hands to touch them. In addition, skin’s high degree of permeability causes us to be in constant interchange with our domain, contributing to metabolism, immunology, temperature regulation, absorption

and health. Skin is multi-purpose, resilient and interweaves us with our immediate environment. We meld with space. Our boundary is not an edge. It is an atmosphere.

My ideas about the role of space in human experience are further defined by architect and theorist Juhani Pallasmaa in his 1996 book, *Eyes of the Skin: Architecture and the Senses*. [9] Pallasmaa outlines an architectural history that is dominated by “ocular-centrism” and calls for design that is “multi-sensory” and “puts the body at the centre.” He places touch at the core of that mission. “Touch is the sensory mode that integrates our experience of the world with that of ourselves. “[M]y body remembers who I am and where I am located in the world.” [10] Citing noted anthropologist Ashley Montagu’s book, *Touching, The Human Significance of Skin* [11], Pallasmaa notes:

“All the senses, including vision, are extensions of the tactile sense; the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility. Our contact with the world takes place at the boundary line of the self through specialized parts of our enveloping membrane.”

He poetically compares sight and touch: “The eye is the organ of distance and separation, whereas touch is the sense of nearness, intimacy and affection. The eye surveys, controls and investigates, whereas touch approaches and caresses.” For Pallasmaa, “Architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses.” [12]

Shiver is meant to open the senses to the expanse of the room. As we move through physical space, our awareness wanders as we attune ourselves with touch, sound and sight. Electrical conductivity and heat radiate off the skin like an aura. Involuntarily, we exercise an innate ability to modulate our senses in order to become more responsive or more isolated from our immediate environment. We may self-protectively shut down our awareness – subconsciously, but with purpose - in order to avoid unpleasant sensations. Physiological and psychological pain are sometimes more feared than actually felt, and may provide us with a great deal of self-information, if we are willing to pay attention. Adding to our confusion about the value and need for sensation are recent commercial technologies, which encourage us to distrust our senses and rely on personal, electronic devices for presumed accuracy about the natural world. The mobile app preempts our skin’s natural ability to know that the weather is changing. We fill gaps of time by scrolling through our smart phones, fascinated by their responsiveness to touch while ignoring or discounting our own abilities to experience sensation through our skin.

For Pallasmaa, the room takes on sentience simply by its existence. “A work of art functions as another person, with whom one unconsciously converses. When confronting a work of art we project our emotions and feelings on to the work. A curious exchange takes place; we lend the work our emotions, whereas the work lends us its authority and aura. Eventually, we meet ourselves in the work.” [13]

For the construction of *Shiver*, it was important to me to contain the water phenomena within a room-sized space to amplify the relationship between a visitor’s skin and the wall membrane. A *room* is broadly defined in the dictionary as, “a space that can be occupied,” [14] and this applies to skin as much as to space. A room becomes the casing of your casing – containing, mirroring and doubling *all-of-you*. It has its own atmosphere, which determines what you will wear and permits or denies the effect of air movement on skin. The size and texture of a room defines your body language and the scale of your gestures. Its layout and furnishings dictate the extent of your impact by describing your range, movement, vocal magnitude and timbre. For most of us, the idea of *who-you-will-be-today* is created in rooms, as we navigate questions of social position, authority, formality and vulnerability.

Shiver was created to be a temple of compassion. It will not ignore or overlook you, but pours with sensation. One could argue that *Shiver* has the visual representation of the body flipped inside out. Images of guts, spine, nerve-endings and muscle are depicted by the circuitry, wiring, valves and exoskeleton of the room. Inside, the clean, smooth walls create an impression of the skin surface. This delineation between the convoluted outside and minimalist inside of the room is meant to separate *structure* from *experience*. Exterior technology evokes biology, but also references psychological filters such as memory, presupposition and wishful thinking – mechanisms we construct to mediate our experience of the world. The spare, monochromatic interior allows for a meditation on pure biological sensation without context, just as the water flows create their serpentine forms without obvious topography.

Although technology in *Shiver* is visible, it remains mysterious, and one's understanding of personal agency becomes slippery. The room's reactions to viewer movement can sometimes be anticipated, but at other times may frustrate or surprise. While many interactive artworks use a mirroring strategy to form the relationship between the viewer and the work, *Shiver* is somewhat less predictable. Leading, following and joining are additional tactics for engaging with this work. The level of intimacy with the room is akin to that shared with parents, lovers, close friends and self. You have to work, as with your human intimates, to comprehend the messages passing back and forth. This dyadic relationship with the visitor may eventually lead to a perception that the room is being sneaky, teasing or flirtatious. The water flows on the wall membrane express a feeling of being *turned on*, wet and shivering in anticipation. [15] The sturdy architectural presence of the room softens, and you become conscious of the physical volume of your body and the space within the room. Ultimately, you experience a perception that the room has a consciousness of its own. Comments from visitors to *Shiver* provide evidence that my intentions are realized: "It taught me a valuable lesson about slowing down and listening," "It has secrets, some it will share, some it won't" and "It is like foreplay. You try one thing and if that doesn't work, you have to try something else."

Organic elements in the four works planned for the *Elemental Bodies* series include water, air movement, heat, magnetism and tingling. Each element has a distinct way of engaging the body surface, activating the senses, bringing the body into direct relationship with its environment, and to the forefront of consciousness. The connection between our inner and outer ecosystems is made palpable. Lappé says: "In a strange way, we identify our skin with our innermost selves." [16] The works in "Elemental Bodies" restate the value of skin as a sensor that gauges conditions and acts as a harbinger for intuitive knowing.

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THE MUSICAL SCORE: THE SYSTEM AND THE INTERPRETER

Thor Magnusson

This paper introduces live coding as a new path in the evolution of the musical score. Whilst being the perfect vehicle for the performance of algorithmic music, it also transforms the compositional process itself into a live event, where play and generativity become essential. Live coding is presented as a highly technologized artistic practice, often embracing graphical elements and language syntaxes foreign to standard programming languages.

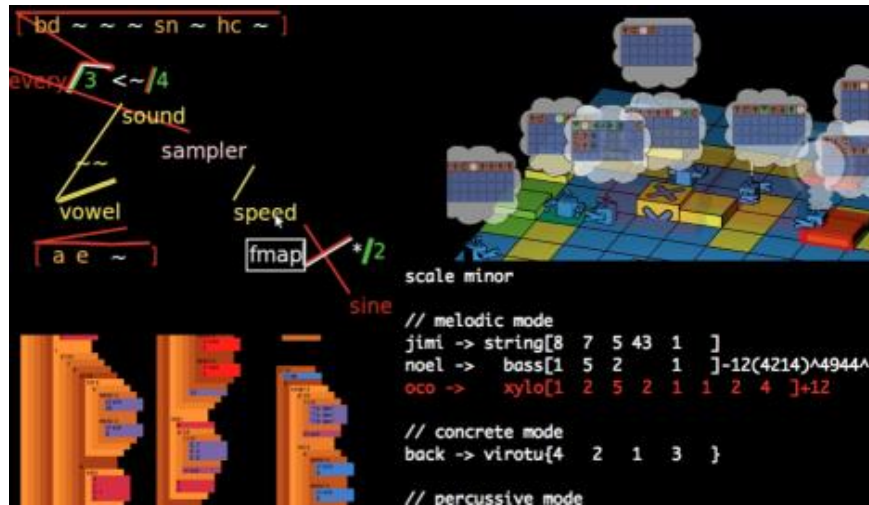


Fig 1. Four different live coding environment displayed clockwise: Texture by Alex McLean, Al-Jazari by Dave Griffiths, ixi lang by Thor Magnusson and Scheme Bricks by Dave Griffiths.

```

autocoder 2
uzc -> | l OUNX A C L LI
qhlf -> kick2{ 1 6 71 }

agent1 -> wood[1 2 5 2 ]
agent2 -> wood[2 1 2 5 ]+12(1421)^1285^
agent3 -> xylo[2 1 2 5 ]-12/2

future 4:12 >>swap agent3

agent3 >> cyberpunk >> reverb

snapshot -> one
snapshot -> two

rit -> lo x o x |
rit2-> | sdf sdio |

group ooo -> rit rit2
future 2:12 >> yoyo ooo

ooo >> reverb

matrix 6

```

Fig 2. A screenshot of ixi lang in action. Various agents are playing their instruments with scores. In addition the matrix window shows another mode of ixi lang coding.

It is a fact that in the evolution of instrumental music the performing musician has been condemned more and more to converting increasingly complicated scores into tones. Musicians became a sort of machine substitute, and finally there no longer remained any room for “free decision”, for interpretation in the best sense of the word.[10]

Opening the Musical Score

The musical score has always been in constant evolution. The score implements the idea of encoding music such that it can be stored, disseminated, and performed at later occasions. Initially the score served as recording device, but it quickly became a tool for thinking music at a more complex level, serving as an extension of the composer’s cognitive capacity. The idea of looking at the score as a technology that has had dramatic effects on music corroborates with the findings of scholars who study the difference between oral and literal cultures. [9] Concomitantly, any history of the musical score will demonstrate the increase of sophistication in the control composers assert over performers. Whereas in early medieval and renaissance scores large parts of the music were improvisations, the 20th century score became highly specific, where explicit and increasingly nuanced instructions were given about pitch, loudness, rhythm and articulation.

In the late 19th century, systems using loom punch cards in order to encode music for machine playback (e.g., in pianolas and other musical automata) became popular and this development of automatic music took a leap in the 20th century with the commercial use of audio recording. As a response, and in an opposing spirit to this machine representation of music, composers began exploring new systems for composition, where graphical scores and textual instructions became more prominent. Related to these developments, the score was increasingly understood as describing gestural information for the performer, rather than being descriptions of pitch organised in time. The works composed in the first half of the 20th century for prepared piano, e.g., Villa-Lobos’s *Chorus no. 8* (1925) or John Cage’s *Bacchanale* (1940), are good examples of this shift.

A further evolution took place in the 20th century’s conception of the musical score. With works such as Stockhausen’s *Plus-Minus* (1963), Pouissieur’s *Scambi* (1957), or Cardew’s *Treatise* (1963-67), we gain the notion of what Umberto Eco calls the “open work” and the “work in movement”, where the form of the composition itself “consists of unplanned or physically incomplete structural units” [5]. In these pieces performers are given a chance to improvise and interpret the score, such that the work has much wider expressive scope. In the words of Stockhausen from the same text as the initial quote:

But fit is noteworthy that the same composers who had called electronic music to life, *parallel* to this work in the years since 1956-57, published compositions which present the performing musician with a completely new responsibility. [...] in this new instrumental music the performer is granted fields for free, spontaneous decisions, to which machines are not amenable. [10]

The motive of this article is not to analyse how machines have evolved since Stockhausen wrote this text. What is of interest is how, in Eco’s definition of the open work, it is clear that the openness under discussion is not a passive interpretation of the piece, but rather an active engagement where the structural elements of the work are manipulated by the performer or the listener. The open work is therefore a system that enables the interpreter to actively engage with the score itself, reinterpret it and appropriate it to the context in which it is performed. In a way, a feedback loop has been introduced between

the performer and the score; an idea that (strongly amplified) becomes a central feature of live coding performances.

The musical score is a system of instructions: abstractions that represent musical gestures for the interpreter of the score. From this perspective it does not differ much from the instructions inscribed in software that generates music. In fact, there is no intrinsic difference in writing music in the traditional staff notation or as software code. The question is rather what kind of interpreter the music is written for and what logic is applied for non-deterministic decisions, if those are used in the piece. As a matter of fact, the computer can easily read staff notation and the human instrumentalist can perform music by reading computer code. This paper will look further at the question of the interpreter, but also how live coding systems, particularly as they emphasise the performance elements of musical coding, can be seen as musical compositions in their own right.

Interpreting Code: The Appeal of Software Art

In the last decade software art has become a prominent field where musicians, designers, programmers, and artists of various art forms explore the potential of the computer to execute their art. Traditionally, software art has focused both on the formal structure of code, following the modernist tradition, and engaged with society and politics where software serves as a cultural critique. [4] Since its inception, software art has shown that writing code can be just as gratifying artistically as painting on canvas or dancing on stage (see www.runme.org). Indeed, the ubiquity of computational algorithms in our daily life has given birth to a new research field called software studies, which engages with the role of software from a cultural theoretical perspective. [6] Software art might be a subordinate field of this research programme, but the question remains if the category of software art is merely a transitional one, due to the omnipresence of software in all types of art and the general realisation by artists that generative features can add value to their work.

Artists have become attracted to software. In the art after Fluxus – which emphasised process, audience participation, and performance as algorithmic instructions – practitioners have become intrigued by the potential of delegating some of their creative decisions to algorithmic processes, which can be based on, for example, stochastic models, environmental variables (such as weather, animal behaviour or human interaction), or artificial intelligence and artificial life. Computational creativity, the idea of writing systems that produce novel solutions to ‘problems’ such as creating art, has proven appealing. [2] In this field, various generative music systems have been created with impressive results, and in the world of painting one might consider the work of Harold Cohen, with his robotic painter Aaron, as a strong candidate (<http://crca.ucsd.edu/~hcohen/>). More recently, this idea of creative delegation to non-human processes is strongly explored in bio-art where biological systems are used as parts of the aesthetic process that create, or indeed *are*, the artwork. (see for example the work of Andy Gracie at www.hostprods.com or the activities of Symbiotica at www.symbiotica.uwa.edu.au)

Although software art is often exhibited in galleries, its natural habitat is on the internet where software can run in the user’s browser or be downloaded as standalone applications. Much software art retrieves data from online servers, strengthening the dependency on the networked grid and relating strongly to another strand of computer based artistic practice called net art. [1] The software is an artistic product, like a book or a film, to be enjoyed and interacted with by the user. It is a system of abstractions that can present any artistic media, but at the core is the artistic expression whose *material* can be any medium, multimedia or code itself, but whose *form* is necessarily encoded as software code. Often the

software is of a generative nature, rendering new versions of the piece, each time it is executed. Here the software operates as a score or a script that is interpreted by the machine. Indeed, in many programming languages, the primary system that executes the code is called the *interpreter*, resonating with how musical scores can be seen as abstract instructions performed by the human interpreter, the instrumentalist.

Live Coding as Delegation of Intention

Musical live coding, [3] [11] arguably a subordinate field of software art, is different in this sense as it requires the human to perform the work. In order to be able to write code as a performance act, the programming language has to be at a level allowing the live coder to quickly write the musical algorithms in an improvisational way. Few audience members would endure the manner in which compiled languages are written, for example. This has resulted in a practice where the live coder “composes” a system outlining beforehand the musical constraints. This, in many ways, is akin to composing music, in particular the 20th century open work scores (as analysed by Eco) that typically break out of traditional notation, for example by using graphical encodings. Creating a live coding system can therefore be seen as a compositional activity although, of course, the boundary between a composition and an instrument are never clear in computer music.

In live coding, the system can be seen as carrying out the role of the musical score, performed by the live coder. This performance is based on a strong practice of engaging with the score by writing instructions for the *language* interpreter. We therefore have a twofold layer of interpreting, one where the human interprets the piece (which here is seen as the live coding language itself) and another where the language interpreter interprets the human performance. Between the live coding system and the interpretation of the computer, a space is created in which the live coder improvises, composing in real-time through writing code, in a style of performance that requires a journey back to the baroque period if we want to find a strong parallel (an activity then called *extemporisation*).

From this perspective, one can frame the live coder as a delegator akin to the artificial life or biological systems mentioned above. If the live coding system is seen as a musical piece itself, the performing live coder becomes the interpreter of that piece, rendering variations of its generative potential.

It should be noted that live coding does not have to involve computers at all. Nick Collins has, for example, done various experiments with live coding of human performances where he has worked with choreographers, dancers and music improvisers in writing instructions that can be algorithmically executed. Collins defines live coding as an activity that necessarily includes a reflexive element, stating that the “more profound live coding must confront the running algorithm.” [3] If we accept this strong definition of live coding – and Collis does acknowledge that many live coding performances do not live up to this promise – it is clear that live coding introduces a new form in musical practice that actually requires performers to exercise their free will during performance and rewrite the score (the running algorithm) ad hoc.

Three Live Coding Systems

The live coding systems I have in mind in this article are typically custom made and unique expressions of their authors. Although one can live code with any interpreted language, such as Python or Scheme,

the typical live coding system is built *upon* such a language, creating a higher-level abstraction that effectively becomes the scope in which the performer works. The questions of affordances and constraints in creative systems become pertinent here, since the constraints of a system often yield strongly creative output. [8]

Alex McLean is currently working on a live coding system called Texture where one writes textual instructions for the interpreter, but this text is of spatial nature where location and proximity define the meaning of the words and their functions within the main synthesis or musical graph. The aesthetics of this programming language reminds us of concrete poetry, whereas the functionality resembles a mixture of Pure Data and SuperCollider, which are both audio programming languages used in live coding. The environment is impregnated with common computer music terms of oscillators and filters, and mathematical functions are presented with common symbols in addition to lines that define the relationships between the signal graph objects.

My own ixi lang is a highly constraint system built on top of SuperCollider. The idea here is to create a performance framework enabling me to write quick code that results in the formation in a musical piece in few seconds. The more I play with this system, the more I get the feeling that the system itself is a musical score that I play differently each time I perform it. If ixi lang is a piece of work in itself, a performance using it becomes like a variation of its expressive potential. I should note that, unlike Adrian Ward with his Auto Illustrator software art piece (www.signwave.com), I do not consider myself a co-author of the music made with ixi lang. As a musical score, the ixi lang exist at a meta-level above direct instructions. The software was released two years ago and it has been very inspiring to see how other people use the system. Surveys, user testing and interviews have confirmed that users of this system enjoy the inbuilt constraints and report that this can yield creative results. [7]

Nick Collins, a long time live coder, has recently created a live coding app for the iOS operating system. The application has a simple user interface, consisting of the letters in the TOPLAP (an organisation concerned with live coding - see toplap.org) name that can be dragged around the screen to program a virtual machine for sound synthesis. The patterns of these letters become the instruction set for the interpreter to generate audio, typically a quite noisy but interesting output. This app is a good example of an open work in the form of a software, presented as a live coding system where the end-user performs the piece, in a manner envisioned by Pousseur when he composed his work Scambi. This work also shows the potential of creating live coding systems aimed for distribution and active interpretation by the performer/listener.

It has to be noted though that live coding systems are very diverse, from high level languages to lower level systems, from graphical representation of code to textual, and using diverse types of input devices, although the computer keyboard might be the most common device. The definition in this paper of live coding systems presented as types of musical scores might be less appropriate for more general audio programming frameworks like Impromptu, ChuckK or SuperCollider. The three systems discussed in this article should be seen as open work scores existing at the meta-level, thus giving the performer a wide scope for expressive freedom.

Conclusion

This article has focused on live coding systems as a development in the history of the musical score. The live coder has to practise the important skills, but the system enables the performance to be highly improvisational, in ways that relate back to medieval and baroque music, but contrary to how the late 19th and 20th century music tradition formalised the musical score and performance (with few exceptions). The paper has drawn these parallels with older music and systems of representing it, but also contextualised live coding as a practice that relates to new types of musical scores originating from the mid 20th century. Additionally, the technological framing of these types of works, strongly engaging with the history of machine music and its encodings, afford new ways of relating to the performer, the listener and the social setting in which musical pieces are presented. Live coding is therefore an offspring of two strong traditions involving the formalisation and encoding of music, often for machine realisation, on the one hand, and the open work resisting traditional forms of encoding, on the other.

Generative (or algorithmic) music is currently undergoing renaissance with novel live coding practices and explorations of algorithms as part of the digital musical instrument design. There is wider understanding of the fact that when our media become processor based, we are in an ideal position to write non-linear scores for new instruments that can contain generative algorithms as core of their sound engine. The days are gone when music has to be encoded or recorded onto linear formats. When the mp3 has been superseded by the app, prolific opportunities present themselves for writing novel music, including musical scores.

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SYMPTOMATIC ARCHITECTURES. SPATIAL ASPECTS OF DIGITAL EXPERIENCE.

Angeliki Malakasioti & Spiros Papadopoulos

The research attempts to introduce a series of conceptual analogies that describe the spatial qualities of cyberspace through the mental state of its users. This happens through the introduction of some altered kinds of architectures; some architectonic scenarios that are referred as 'symptomatic' architectures, since they are discovered through a process of diagnosis of the mental and psychological experiences of the internet user.

Call It Space

When, in the course of a digital era, the term 'cyberspace' is infiltrated through continuous technological scenarios, space is no longer seen as the mere background of events. It becomes the foreground of every single human experience of ubiquitous digitality – an aspect of 'life processing' mechanism inherent in each computer generated/mediated environment.

Space, not in its physicality – materiality is attempted to be traversed – but in its contingent aspects of its abstract forms; call it imaginary – call it mental – call it digital – call it space born out of noetic ingredients mixed together in a synthetic recipe of personal, electronic experience; experiential referents of oneself's head-on collisions with cyberspatial promises – or premises – born out of contemporary reality.

And then, experience is binary distilled, imagination blown up and space germinated. Spatial sprouting is taking place in the totality of personal mental functions, in the unnamable morphing of thoughts, actions and translations. All amalgamated into the digital environment as multiple shades of sole inhabitations; inhabitations of divergent personas, disordered players, inertially echoic avatars and telepresent 'switch-on switch-off' lives.

Symptoms Elicited

These situations, these parts-of-the-whole, as bi(y)t(e)s of information, either code generated or humanely derivative, constitute the symptoms of digital experience. Symptoms to be felt, lived and catapulted into the process of intimate space translation.

Spatial experience is a symptom – what is given to the 'observer,' what is manifested and constituted as an essential phenomenon. Its principles are not ones of sovereignty and termination, since its nature refers to the single, but not absolute, formation of a disorder abstract. Symptom is a piece of an incomplete pathology, an unfulfilled actualization of a solid state. It constitutes an inseparable relationship, "a primary stratum of the indissociably signifier and signified." [1] This connection between 'symptom and disorder,' as the diptych 'experience and digital space,' indicates the signaling and translation of what exists, but not the absolute depiction. Digital experience is like a symptom, a mental phenomenon outlining a kind of space which will become uniquely personal and noetically invented.

Improvising Pathologies

Digital space evokes fragmentation and fluidity, thus, fragments constitute the compositional elements of contemporary, cyberspatial endeavor. Mental qualities become the playground field of digital experience, due to the challenging immateriality of space. Therefore, space is correspondingly constructed parallel to the composition of individual mental states – states altered, distorted, and inspiringly disrupted, as if parts of a dis-incriminated pathology.

Thus, the symptom is not the pathology itself, in the same way that “the map is not the territory.” [2] Symptom is a form of mental representation of an event, a phenomenon inherent in a unique spatial narrative. Only a set of symptoms can potentially constitute a disorder, therefore digital experience can be regarded as a natural and dynamic, mental state.

CorpoRealize

Each symptomatic indicator is a signifying spatial phenomenon. It is enticed by multiple scenarios, brought to life, and then, is manifested as a phenomenon waiting to be ‘realized.’ But every symptom is a form of space realization, which in terms of digital immateriality can become the corpus of the disembodied mind; or the notion of the absent body that is re-present-ed through this altered state of consciousness. “In every symptom, there is, so to speak, the whisper of a direction, the hint of a path;” [3] this ‘direction driven’ report composes a kind of diagnostic awareness, that discloses a mentally constructed space; a fragmented, and rather demystified, space – a symptomatic architecture.

Dis + Sociare

The digital observer must invent a new, altered diagnostic tool [4] – a handbook of the mental, symptom-like, digital phenomena. Symptoms are juxtaposed to self scenarios in digital environments, both filtered through spatiality issues and architectural derivatives.

The most complex and multifaceted view of dissociation refers to the act of separating, breaking, disuniting or decomposing; or put simply, the act of removing from association. Digital inhabitation is direct referent of identity formation or role-playing conditions. A bunch of dislocated selves are invented and acted out, transferring characteristics of, both existent and non-existent, personalities. Dissociative space is generated and thus, it is considered on the basis of experience that includes alterations, disruptions or, sometimes, mutations and breakdowns of the individual’s structures concerning memory, perception or consciousness.

This space is discontinuous and divergent – all of these qualities placed as experiential composites of what can be described as an “ocean of leaky selves.” [5] Contrary to the deviant sense of ‘leakage’ and the diffusing quality of the ‘ocean,’ contemporary identity proves a surprisingly congruous outline; all these inconsistencies of self decentralizations and role constructions can formulate the delineation of its whole image, a portrait made of a plethora of selves merged into one and sole (id)entity.

Verge on

Digital encounters include liminality; and liminal encounters include a decision of transference or an unconscious act. Personal sense of flow is sometimes affected by disruptions of perception, that verge on the limits of differentiated states. A whole new space full of inertial qualities is constructed and then, is offered for inhabitation and interaction; a space that lies between two states of consciousness or two ways of existence. Inhabiting a threshold is an essential element of digital experience; a threshold as a bipolar mechanism – one that leaves the biological body behind, while moving towards an immaterial digital environment, or one of departure, while ‘logging out’ towards the physical world. In both ends, experiential fragments are transferred and a threshold mechanism is manifested in the two directions. Inertia acts as a spatial metaphor, and outlines issues of resistant, direction-shifted and perpetually fluctuating space.

Echopraxia

Digital space does not have a shadow, but digital actions do. For every digital event there is the respective cyberspatial echo born out of the individual's, volitional or not, act; an act, like an echoic ‘praxis,’ resembling the ideo-verbal, psychotic symptom of ‘echopraxia.’ [6] This kind of continuously constructed echoic space consists of all the cybernetic material that constitutes what is called ‘digital shadow’ or ‘footprint’ – the totality of information that is produced and stored in digital space.

Every user is estimated to produce a unique ‘history,’ namely incredible amounts of informational shadow by every single movement in cyberspace. This shadow, just like a kind of electronic dust, gathers up and follows oneself, resembling a ‘hypermnnesia disordered’ state – an extended and unusual aggregation of mental elements. An unconscious sum of mental constructions which, combined with the conscious ones (dissociated spaces, de-centered and multi-personal environments, liminal spaces with inertial qualities), brings one back to the importance of the invented self scenarios as spatial mechanisms. Since space is experienced through the individual's mental phenomena, symptomatic architecture is the erection of structures that either interpret or, conversely, provoke new self scenarios.

Tell the Tale

“One describes a tale best by telling the tale.” [7] If symptomatic architecture is considered as a dynamic diagnostic process of the multiple digital scenarios being experienced, then it can consist of a mixture of observations, evaluations and interpretations that give a hint about space – both as narrative and narrator. It is not the accuracy or solidity of a set of qualities that best describes digital space but the process of ‘telling the story’ – of representing personal experience through symptomatic architectures that tell a tale – one without a nameable ending.

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MY META IS YOUR DATA

Nicolas Malevé

This paper examines different data practices, taking examples from “social” networks, activist collectives and open source communities and looks at the recent decisions taken by major forums such as the EU Council, various national parliaments and ACTA negotiators. It analyzes how these decisions threaten a wide variety of spontaneous as well as organized collaborations, social interactions, and cultural developments.

The following essay is a result of my experiences with Constant, a Belgian-based cultural association working with various media since 1997. For the past decade, we have been exploring the potential of the culture of sharing, particularly in the context of artistic, creative and cultural content. In early 2000, we became interested in the way online services provided an infrastructure for sharing and collective production. Later branded as Web 2.0, these services helped popularise Creative Commons licenses. A striking example of this attitude was articulated in the early ‘terms of use’ of Flickr, a photo sharing service created in 2004 by the startup Ludicorp. It stated: “We encourage users to contribute their creations to the public domain or consider licensing their creations under less draconian terms than have become standards in most jurisdictions [...] Ludicorp undertakes to obey all relevant copyright laws however misguided we may all judge them to be.” [1] Though this initial statement sounded promising, within a few years the rhetoric had completely changed. Big players bought up small platforms in order to expand their services and increase the value of their portfolios. Google bought Blogger and YouTube; Yahoo bought Flickr. Since 2005, the tone has changed dramatically. Now, upon accessing Flickr’s copyright policy, we find the standard Yahoo copyright terms. The once-critical perspective has long since been replaced by copyright policies focused on avoiding infringements. Rather than encouraging re-use, policies are now aimed at protection, restriction and enforcement. This shift, and its consequences, should not be underestimated. This is the basis of my reflection on contexts of interpretation and why they matter.

User Data and Contexts of Interpretation

On first sight, most services seem to have kept their identity. Browsing Blogger, YouTube and Flickr, each feels like a distinct entity. But the company owning the platform actually controls the policies, and monitors data traffic across the variety of platforms they own. Through this access to user data, the companies learn from user habits, tastes, relationships, and use this knowledge to provide marketing specialists and advertisers with precise statistics and personal profile data. In essence, the function of the Web 2.0 platforms is to transform the mess of social relationships into formalised and comprehensible behaviours. As relational data is of strategic importance for creating valuable user profiles, every single action expressing these connections must be captured. Therefore, the platforms require that you state your preferences and affinities. They constantly provide you with formats, interfaces, and icons with which to express social connections. It is not enough to drop a note or a comment, you have to ‘login to like this image,’ ‘accept a friend request,’ or confirm which people you wish to disclose your content to.

This parasitic formalism occurs at every moment of digital socialisation and creates a feeling of awkwardness: friends on Facebook may only be acquaintances, but the interface forces you to either categorise them as friends, or else refuse to engage with them at all. Or consider the peculiarity of being

asked to identify familiar people in a picture in order to log in to our account. All these awkward requests can be understood as symptoms of the fact that the context of interpretation is outside of our reach. We are asked to express our likes and dislikes in such a fashion, only because the system requires this kind of structure in order to process the information. How it actually works, we don't know; what we do know is that when we surrender to its ambiguity, the system rewards us. When somebody accepts us as a 'friend', we can access their content. Identifying a half-drunk classmate in a blurred photograph allows us to log in to our account.

But, as Andrew Goffey and Matthew Fuller explained in their lecture "From Grey Eminence to Grey Immanence: The Ambiguities of Evil Media," "Crucially, systemic ambiguity is as much about the production as it is about the deciphering of signs. Becoming able to read the shifting balance and distribution of forces in fluctuating patterns of uncertain signs is one thing. Being able to produce such signs, to turn them to your advantage, is another." [2] Web 2.0 capitalises on this systemic ambiguity.

Every single mouse click connecting A to B is thus captured, logged and processed. Since this information is crucial, it needs constant verification – it needs the user's cooperation and care. As a user of social platform and Web 2.0 services, you are put to work. Not only do you produce content and connections, you also have to control the quality of the circulating data. You rate, recommend and report. And the interface rates you back: your performances are public. One can see how many comments and 'likes' you have received, how many people have played your video. You have 500 'friends,' 5 'badges,' and 3 'followers' while you yourself 'follow' 100 people, and 'you haven't added any tip near Vigo, yet.'

For their online presence, many activist collectives, though critical of commercial media, use a combination of open-source software and social network add-ons. They are often ambivalent about what to keep under their own control, and what to delegate to online services. Many forms of delegation exist: 'follow us on Twitter,' 'like' this article, 'contact us at ...@gmail.com'. As reputation systems are extremely difficult to (re)produce without massive investments, these collectives 'outsource' such systems to social networks. The same is true for any functionalities requiring real-time management of communication with a large user base, connections with cell phones, or specialised features such as maps or videos. The online presence of such groups can be pictured as a thin layer managed by the group itself, superimposed on data from external services: connecting systems, but without any control of how the data is managed and interpreted.

During the student demonstrations that took place in England this year, the British police used a technique called kettling. Kettling, as Wikipedia defines it, is "a police tactic for the management of large crowds during demonstrations or protests. It involves the formation of large cordons of police officers who then move to contain a crowd within a limited area. Protesters are left only one choice of exit, determined by the police, or are completely prevented from leaving. In some cases protesters are reported to have been denied access to food, water and toilet facilities for a long period." [3]

A group of students and volunteers teamed up to create Sukey, an application informing protesters of the movements of the police, and directions protesters should take in order to avoid being trapped in a cordon. The information is transferred in real time via a web platform to and from mobile phones, and is provided by protesters, observers and people monitoring the news. Since many people rely on the authenticity of this information, identification of sources is crucial.

Sukey searches for messages on Facebook, Twitter, Tumblr and other social networks using the hashtag #Sukey. The results are then filtered using what one of the programmers calls “a kind of algorithmic reputation management.” The use of Sukey has proved very useful for protesters who successfully used it to escape kettling. But it has also raised many questions regarding the way it relies on external platforms to establish the reliability and trustworthiness of its sources, in a context where trust is essential. It tapped into the social networks’ power to aggregate and spread information and map out relationships, and used this power to distribute strategic information to protesters. But in doing so, it also fed the data-hungry machines of social networks with sensitive information about protesters and their circles of friends.

Using the Web 2.0 to outsource the real-time management of information and the quantification of trust, means relying on parties that have no interest in protecting user information from prying eyes, and are not committed to systematic encryption or erasing logs, but instead run systems designed to eavesdrop and record every possible element of relationality. Past experience has shown how their loyalty, more than often than not, lies with the powers that be. How long before the street corralling gives place to the digital cordon?

The example of Sukey is important on more than one level. It questions how activist applications relying on connections to social networks can preserve their autonomy and control the flow of data. It also emphasises the importance of legislation regulating how and when authorities may access information gathered by Web 2.0 platforms.

Let us now move on, from the general context of social media to the subject of the harmonisation of legal frameworks which regulate the way these media (and their corporate governance) operate within European law.

Parallel to the development of the Web 2.0, an impressive number of international agreements, directives, legislative bills and draft recommendations have landed on the desks of decision-makers in the USA and Europe (at both EU and national levels). The legal framework regulating the relationship between authorities and user data is currently undergoing a process of harmonisation. Brandishing the spectre of piracy, these agreements invariably emphasise the same point: strengthening cooperation between service providers and the authorities. The negotiators of the Anti-Counterfeiting Trade Agreement wish to promote what they euphemistically refer to as a “cooperation between service providers and right holders to address relevant infringements in the digital environment.” [4] The experts consulted by the European Commission provide a more concrete explanation of this cooperation. They consider the service providers in a favourable position to not only “contribute to prevent” but also “terminate” infringements, [5] and therefore suggest to the Commission to “involve them [the service providers] more closely.” [6] The Trans-Pacific Trade Agreement proposes that its signatories create “legal incentives” to ensure service providers’ cooperation. [7] Clearly, adjusting legal texts in order to promote cooperation between governments and service providers is a recurring theme, meaning service providers are expected to disclose user data to authorities, to assist in monitoring user behaviour, and even to pro-actively take appropriate punitive actions.

But who exactly are these ‘service providers’? The definition of the term varies from one text to another. Service providers can either be companies providing access to the Internet (also known as access providers) or companies providing services on the Internet. This rather broad definition can be explained in a historical perspective. Access providers and service providers both followed the same evolutionary path: an assortment of small startup companies, most of which were later bought up by larger ones. As

Kleiner and Wyrick strikingly formulate it in their essay “InfoEnclosure 2.0”: “The mission of Internet Investment Boom 1.0 was to destroy the independent service provider and put large, well financed, corporations back in the driving seat. The mission of Web 2.0 is to destroy the P2P aspect of the Internet. To make you, your computer, and your Internet connection dependent on connecting to a centralized service that controls your ability to communicate.” [8] By reducing the number of access providers and online services to a few big players, a powerful movement of concentration and homogenisation is taking place. The access providers determine how one can access digital communication; the online services increasingly define the framework in which content, contacts and dialogue take place. For governments, gaining access to these central reservoirs of information about their citizens’ behaviour becomes a strategic issue. And both access providers and service providers can provide the same ‘service’: making available their concentrated silos of data.

Currently, although service providers are regularly mentioned, access providers still remain the preferred candidate for this kind of cooperation, as they have complete access to data traffic. But recording, analysing and filtering data traffic costs money. Governments don’t have the money to finance such an infrastructure. And so a new scenario is beginning to take shape, with more clearly defined roles for all parties involved.

Service providers monitor and filter user traffic and cooperate intensively and pre-emptively in the struggle against copyright infringers and criminals, going above and beyond their traditional role of neutral intermediaries. This requires setting up a costly infrastructure, which can then be used by the service providers to allow different levels of access according to the nature of the content being transferred. Because the service providers have concentrated users’ attention and interaction into a small number of specific channels, the providers can strike deals with the services: users downloading mp3s from the iTunes Store enjoy full bandwidth, users downloading the same mp3s from Jamendo are allowed only downgraded access. The infrastructure built for surveillance can thus be recycled in order to develop a commercial model of bandwidth discrimination, abandoning the tradition of net neutrality.

Although some elements of this scenario are currently being tested in France, the United Kingdom and the United States, it still clashes with existing competition policies. Recently, Neelie Kroes, European Commission Vice-President for the Digital Agenda, voiced some very strong rhetoric against such traffic discrimination: “Mark my words: if measures to enhance competition are not enough to bring Internet providers to offer real consumer choice, I am ready to prohibit the blocking of lawful services or applications. It’s not OK for Skype and other such services to be throttled. That is anti-competitive. It’s not OK to rip off consumers on connection speeds.” [9] But as she herself needs the cooperation of access providers to finance broadband access (around €200 billion) for European citizens, will she be able to refuse them such a return on their investment? Since the future development of the digital economy depends on large investments, how long can we rely on competition policies to defend net neutrality?

To summarize: I have shown how the commercial scheme of Web 2.0 was built on the exploitation of user data, and how a collusion of interests between access providers and service providers could bring about a discrimination of access. The concentration of user information in Web 2.0 databases, and the monitoring of traffic by access providers, creates an enormous reservoir of data on citizens’ behaviour. Collection of user data is defined by the terms of use of web platforms, and government access to the information collected is defined by legal frameworks and international agreements which are constantly being developed and refined. The legislation currently under way, and the social networks’ terms of use, both demonstrate a similar attitude toward the gathering of user data: they disregard the users’ ability

to discuss, interpret and change this data. In these contexts, user data is not seen as an area for cooperation, and the context in which it is interpreted is deliberately kept out of the users' reach. Furthermore, the very process by which this data is stored and modified remains opaque as well as unilateral. At this point, we should consider the OpenStreetMap (OSM) project, which deals more intelligently with user data, and provides a wonderful example of how terms of use and legal decisions can be taken collectively by users; how a context of interpretation can be designed and maintained by a community.

In short, OSM is a Wikipedia for maps. Users upload geolocated information (GPS traces) to a server; they can then edit, clean up and enhance this information, before it is used to produce online maps. The site's database can be downloaded to create 'mirror' sites or geolocator services, or any other project requiring geodata. At various levels, the OSM project shows a clearly different approach compared to Web 2.0 data practices. Whereas Web 2.0 services provide users with an interface that conceals meta-data and logged behaviour, OSM is proactively 'open' about its use of user data. The OSM experience starts by learning to think differently about the GPS device. Rather than merely follow its instructions, apprentice cartographers are asked to focus on how the device graphically renders their GPS trace and logs their itineraries. These logs can be uploaded to the project's database, and further processed to indicate roads, buildings, rivers, etc. Whereas recent legal developments in this area have been controversial and non-transparent, in OSM the user community establishes its own rules through discussion and consensus.

An important legal question recently arose, which provided an excellent insight into the dynamics of this user community. A few years after OSM was launched, participants realised that the license under which they were distributing the data included in the maps was not legally valid: geographical data does not fall under the scope of free licenses which protect 'original' creations such as literary works. 'Objective' information, such as geographical coordinates, falls into another legal category in many legislations. The OSM foundation, which facilitates the operation of the project, set up a process of consultation (lasting several months) with participants including legal specialists who volunteered their services. The goal was to redefine the terms of use in such a way that everyone can simply use the OSM data, but that users are required to add to the OSM database any corrections, additions or other modifications they make to the data. It was interesting to observe how participants convinced each other, in online and offline discussions, of the importance of protecting the open-source nature of the software, and preventing their common effort from being distorted while still keeping it open; and how they accepted to formalise their participation somewhat, in order to safeguard the fundamental motives behind their participation. This type of discussion demonstrates once again how anything considered as 'public' is subject to a constant process of re-negotiation.

What these examples show, is that there is no inevitable fate forcing us to accept that the context of interpretation of the data we produce using digital technologies should be kept out of our reach. The OSM project demonstrates that social dynamics and dialogue can produce comprehensive agreements on how to collectively share data, and how to take the necessary legal decisions collectively. It shows the power of open platforms and the difference we can make by being actively engaged in creating and maintaining a context of interpretation.

OSM is, although remarkable, by no means an isolated project in terms of its philosophy and development. Today we need strategies for making collective practices of data care a part of the legal dialogue. But more than ever, we need to experiment with collective forms of management, in which the administration of user data is not synonymous with policing or profiling. We can begin with simple steps, such as

running a group's blog or imagining new scenarios for exchanging data, before moving on to more complex undertakings such as installing a web server, exploring new platforms and different policies, taking part in their design, promoting them, and participating in their maintenance. The task is huge, but it can be broken down into smaller individual actions. What we will gain in freedom and knowledge, we will have to pay for with time and/or money. But if we wish to gain access to the contexts of interpretation, free is better than 'free'.

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INTRAINER SOCIALITE: EMOTICON JACKET FOR SOCIAL INTERACTION

Kristin Stransky Mallinger

intraInter socialite is a wearable computing experience that investigates the loss of intonation and body language that occurs at the intersection of computers and textual communication. Emoticons, an attempt to express emotional nuances in the virtual realm, are used to subtitle interaction that occurs in the physical realm. This is achieved through force sensors that display emoticons on a jacket with a LCD screen.



Kristin Stransky Mallinger, intraInter socialite, 2011, Emoticon jacket with LCD screen, Lilypad Arduino board and force sensors (artwork and photography © 2011 Kristin Stransky Mallinger).

Emoticons construct a variable language meant to convey emotions, physical and mental states in a textual context. An emoticon consists of various punctuation and letters from the Latin alphabet to create perpendicularly oriented graphics. Although it creates a graphical language and can be universally understood, it still allows for user and virtual service interpretation. Some services — IM and email clients — convert the text to a graphic, which it is perceived to represent. These graphics are an inconsistent interpretation and vary according to the client.

Two or more users that are using messaging clients can use different clients within the same conversation and get different graphics for the same text. Users can also include additional or fewer characters than what the service recognizes, which will effect whether the client converts the text to a graphical representation or not. For example, :) would in most cases be perceived as a smile graphically, connoting a happy emotion. However, :-) may be the text recognized by the client to produce a graphic. Textual representations and their varied graphical outcomes can change the interpretation of the message and emotion. Some users may feel that :-) is a more effective smile, whereas some would argue that :) or the graphics produced are more effective.

The inconsistencies in representation of emotions can lead to some confusion. Another way in which emoticons can lead to confusion are when the emoticon is not supported by a client or is not common in a user's repertoire. When an emoticon emerges, the service is often lagging in converting its use to an agreed upon graphical interpretation. Additionally, there are many different emoticons being created to fill the user's need for emotional expression. Both users may not be proficient in a particular emoticon's connotation and this may lead to an emotional or contextual disconnect in the conversation.

Just as a person's physical cues can be misinterpreted by those interacting, emoticons and their inconsistencies can lead to misinterpretation and confusion. They can also contribute to the lexical direction and enhance a conversation. [1] Emoticons provide non-verbal indicators of emotional cues that can be lost in text-based interaction, but also reinforce physical indicators if introduced to a face-to-face social exchange. When introduced to any social situation, virtual or physical, emoticons can be used to reinforce or subvert the verbal/textual message. They can change the message intent/content in as few as two keystrokes. [2] In the virtual realm, emoticons are often a subtitle for text and are often treated as a way to interpret the tone of the message. When bodily or verbal intonation infers one message and an emoticon is introduced that infers another or when both physical and textual cues are given, which is to be used as the interpretation? Do physical indications, or textual cues that are deliberately displayed, reveal the desired intonation?

intraInter socialite is an emoticon jacket with LCD screen (Fig. 1). The focus of the jacket is to create subtexts for interpersonal human interaction. The wearer uses force sensors to create computer textual subtitles for physical interaction. My investigation into wearable computing with this project is an inquiry into the loss of intonation and body language that occurs at the intersection of computers and textual communication as is evident in today's instantaneous communication and technology-centric culture.

This project explores emotional content and expression in multiple ways. The jacket:

- acts as a non-verbal, non-corporeal intermediary to a bodily and potentially verbal social interaction to create another plane of emotional meaning.
- potentially contradicts or detracts from that which is physically and verbally expressed.
- expresses, reinforces and clarifies that which is physically and verbally expressed.
- is a physical computing experience of a virtual communicative convention.
- expresses the development of an emotional and graphical mode of expression utilizing textual punctuation.
- explores whether a barrier or channel is created for emotional content through technology and physical computing.

The piece, *intraInter socialite*, asks several questions of the interaction between the user and the jacket and the social experience while wearing the jacket. Does the expression of content through electronic means become a prosthesis and/or hindrance for inter-human interaction? If it is a prosthetic, does an emotional language intermediary offer assistance for those with autism or empathic disorders? Is meaning lost and are its prosthesis capabilities diminished when precision is taken away? Emotional content is critical for daily communications and message interpretation. [3] How does the role/character of the interactor serve as a truth-teller and how does it help the user to reinforce false emotional reactions? [4] In this case, the natural method of conveying emotion through applied pressure, leads to an imprecise emotional connection and brings the emotion being conveyed into consciousness for both parties.

In this application, the effort put into replacing the nuances of personal communication with punctuation and textual cues in the virtual realm creates a subtitle for the conversation and interaction that occurs in the physical realm. It creates a range of implied emotion from the wearer. This also introduces an imprecise control over the emoticon displayed and the perception of the emoticon in the context of the interaction. The user has the ability to change the experience of the conversation when they attempt to control the level of emoticon displayed.

The techno-centric geek and socially inept express themselves more freely and create a powerful online or electronic identity through and behind the computer screen. The electronic veil is lifted through a forced vocabulary and a forced interaction in the human world. The wearer has only the jacket to hide behind, no computer screen and no alternate identity, pictures or avatar. With only a jacket in the middle of the interaction, the focus of the conversation may dramatically shift to the screen and what is being displayed. How does this create a “veil” even though the interactors are able to see each other in real-time physical space? Experimentally, adding the language of the virtual world to a physical interaction may allow the users to focus on the jacket instead of the interaction. [5]

Emoticons are an important non-standardized aspect of communication in virtual space that help convey emotion and additional meaning. They were created to help fill an emotional content void that was not being filled by short, text-based communication. Textual punctuation has become its own graphically and internationally interpreted language through emoticons. *intraInter socialite* attempts to study the effects of adding the emoticon to physical computing and interaction. It also calls to attention the use of textual elements to create graphical emotional elements to a virtual interaction. It allows the user to subtitle and create additional emotional content for the interaction, whether true or false.

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A MYRIAD OF VIBRANT PHENOMENA: THE HIDDEN WORLDS OF AUDIOVISUAL ART-SCIENCE

MARCO MANCUSO

What is today recognized as "immersive art-science" is a form of creative expression meant to rise above the notion of art as abstract representation. This historical-critical statement of this lecture is to map those audiovisual artists acting with a "discovery approach", observing and recording, working without the use of video or digital techniques but obtaining the flux of sound and images only by natural and spontaneous scientific phenomena.

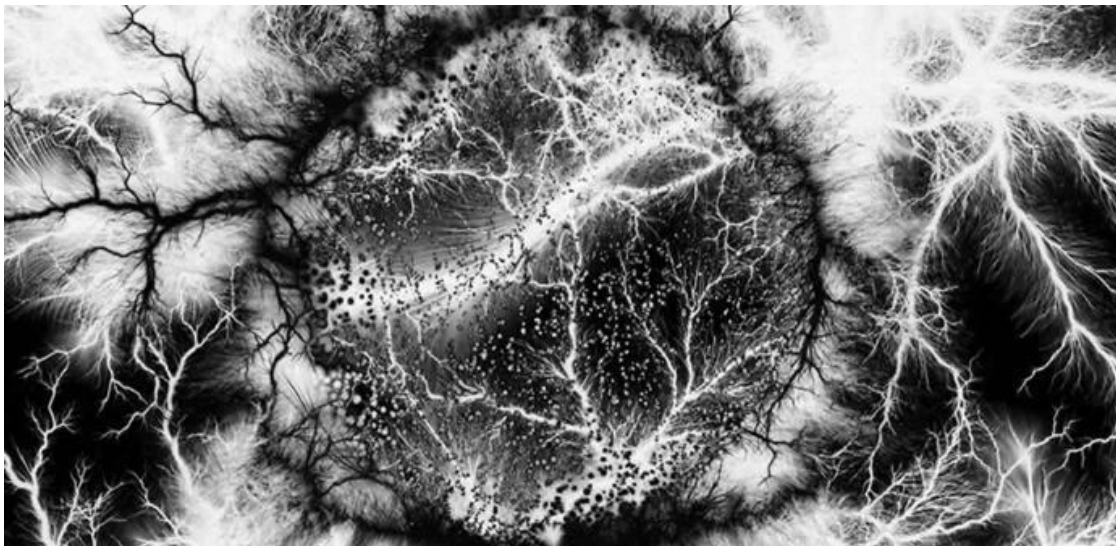


Fig 1. Energie!, 2007, Thorsten Fleisch, video HD, 5:03 minutes, Copyright Thorsten Fleisch.

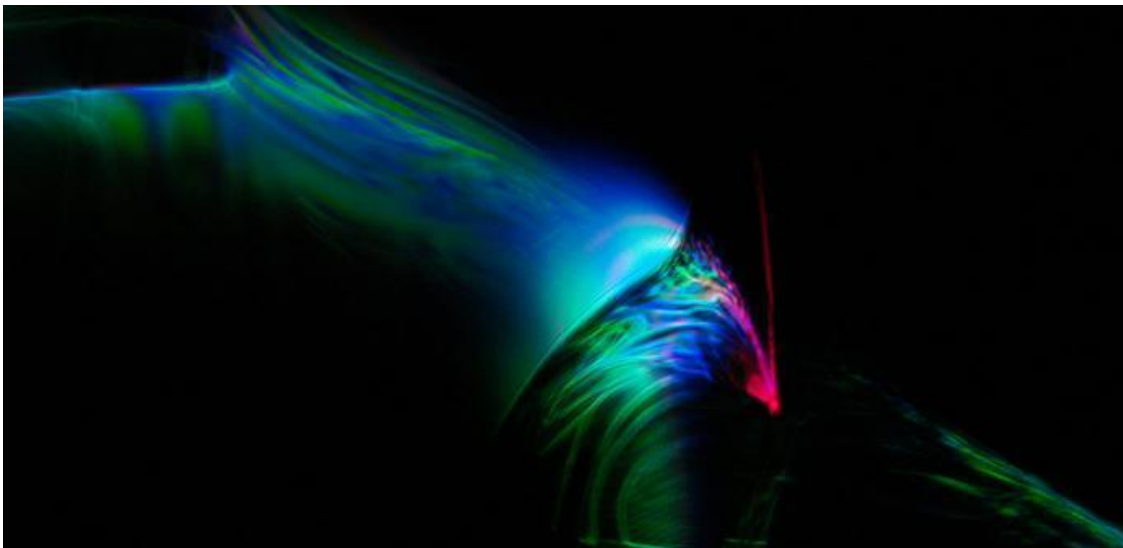


Fig 2. 10000 Peacock Feathers in Foaming Acid, 2006, Evelina Domnitch & Dmitri Gelfand, live performance, Copyright Portable Palace.

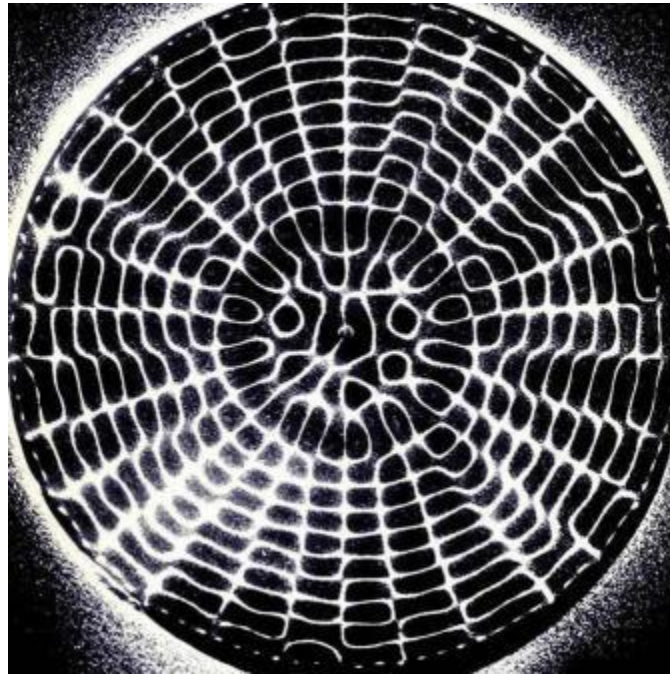


Fig 3. Sound Mandala, 1967, Dr. Hans Jenny, powder on metal plate, from Hans Jenny, *Cymatics: A Study of Wave Phenomena and Vibration* (MACROmedia Publishing, NH, USA, 2001 - <http://www.cymaticsource.com/>), 295.

In his *De Rerum Natura* (*On the Nature of Things*), Lucretius denies any sort of creation, providence and original beatitude, stating that man broke free from his condition of ever present need through the use of techniques, which are transpositions of nature. The gods do exist, although they neither created universe nor they care about men's problems. Lucretius affirms that all our knowledge about nature shows us the universe as infinite, made by complex forms and composed by atoms. It follows natural laws, regardless of man's needs, and can be explained without resorting to deities. [1]

Nature as Art

Between 1899 and 1904 the German philosopher and biologist Ernst Haeckel published a book of lithographic and autotype prints entitled *Kunstformen der Natur* (*Art Forms of Nature*), one of his best known works and a symbol of his zoological research and philosophy, centered on the observation of marine micro-organisms and various natural species and animals. [2] The complete volume, consisting of over 100 lithographs, each accompanied by a short descriptive text, obtained a great success even among the non-specialist public and among some Art Nouveau artists, committed to find new models to be used in the nascent industrial design and in architecture.

In this regard, the volume lends itself to multiple assessments: as a zoological work depicting the evolution of organisms, as a work of art, as a book of aesthetics that focuses on observation and perception as a way of knowing. Aesthetics, as the science of beauty, intent on understanding the nature in relation to art.

The tables of the book, according to a geometric arrangement of the drawings, are based upon the microscopic siliceous skeletons of radiolarians and diatoms, the umbrellas of jellyfishes, the tentacles of sea anemones and spirals shells of molluscs. These illustrations depict therefore the law that regulates natural energy phenomena: the evolution, the fact that organisms are formed and transformed over time, according to genetic relationships of descent, from a common original type. [3]

Looking at these tables, we can see how nature is not only capable of creating spontaneous art forms, but also of establishing a direct connection with certain geometric aesthetics, starting from a fundamental unit/core and reaching a more complex entity, as consequent evolutionary practice of adaptation.

Numbers & Forms in Evolution

One of the most currently fascinating mathematical theories is the Theory of Fractals: according to the definition of its recently passed away discoverer, the polish mathematician Benoit Mandelbrot (1975), who started his researches from the fractal structure found out by french mathematician Gaston Julia in 1920, fractals are geometrical figures characterized by a repetition to infinity of a same pattern on a more and more reduced scale.

Mother Nature is filled with forms very similar to fractals, which don't follow in any way any of the rules of Euclidean geometry. A coastline, the branches or the roots of a tree, a cloud, the snowflakes, the zigzag lightning bolts and the leaf venation patterns: these are only a few examples of fractal forms spontaneously creating in nature. Among these ones there is the spiral, the fractal form par excellence.

So, how do we forget the hypnotic editing of energetic spontaneous fractal branches produced by a controlled electron beam, emitted from a cathode ray tube on a photographic paper, in the poetic audiovisual work *Energie!* by German artist Thorsten Fleisch? [4] And, what about the time shifts, animations and techniques for microscopic natural observation in John Campbell masterpiece *Li: The Patterns of Nature*, showing how the natural world itself, due to reproductive, conservative and evolutionary processes, can create complex architectures and structures based on physical, chemical, electromagnetic phenomena ? [5]

The procedural, generative, hieratic and evolutionary element can be considered the root of all these arguments, related to a modern "computational ecology": almost 40 years of studies, analysis and researches, have passed between Alan Turing's revolutionary theories about morphogenesis (the capability of every living being to develop complex bodies, starting from very simple elements, using self-assembling processes without an external guide) [6], which followed those by bio-mathematician Thompson D'Arcy in his work *On the growth and form* (1917), and more recent studies (1980-1985) on genetic algorithms (a particular kind of evolutionary algorithms utilizing mutation, selection and other recombination techniques in order to guarantee a certain number of possible evolutive solutions. [7]

Those researches were meant to point out the almost computational characteristics of Mother Nature on one hand, while on the other they confirmed the machines' capability of simulating/replicating complex natural phenomena.

Speaking deeply about pure mathematics and numbers, we could consider also the four dimensional Quaternions, discovered in 1843 by Irish mathematician William Roman Hamilton, who was searching for a way to extend complex number on a higher quantity of spatial dimensions. Quaternions find uses

today in both theoretical and applied mathematics, in particular for calculations involving three-dimensional rotations in computer vision: exactly what Thorsten Fleisch did in his work *Gestalt*. As stated by Thorsten Fleisch himself: "Given the fact that a film is the visualization of a mathematical element, it is theoretically possible to render it as high a resolution as technically feasible without losing any detail".

If we also take into consideration the definition of "Moirè effect" in the work *Spray* by Carsten Nicolai, the direct connection between the audiovisual outcome and the numeric and mathematical element is very clear. In physics, the Moirè pattern indicates an interference figure, frequently found in nature, composed by two superimposed grids at a specific angle, or even by two parallel grids with distanced chains in slightly different ways. The Moirè optical effect is regulated by accurate and complex sinusoidal equation where, at the variation of parameters and variables, correspond particular changes under the optical and visual point of view.

And again, one of the most important aspects of John Whitney's production was the artistic use of what he defined as "Computational Periodics": the achievement of a "series of harmonic events in the audiovisual presentation following a sort of digital harmony". [8] In 1966, the father of computer graphics developed the work *Permutations*, together with Dr Jack Citron at IBM laboratories as an artist-in-residence, where a specific simulation of a musical progression can be achieved through the multiple superimposition of graphic objects in order to create symmetries and counterpoints similar to the ones concerning rhythm and music.

According to Whitney himself: "In Permutations each point moves at a different speed and moves in an independent direction according to natural laws quite as valid as those of Pythagoras, while moving in their circular field. Their action produces a phenomenon more or less equivalent to the musical harmonies. When the points reach certain relationships (harmonic) with other parameters of the equation, they form elementary figures."

Visualizing Sounds

Again, in 1787, the jurist, musician and physicist Ernst Chladni published a book called *Entdeckungen über die Theorie des Klanges (Discoveries Concerning the Theory of Sound)*. [9] With this text, based on experiments on the field and observations, Chladni laid the foundations for that discipline within physics that came to be called "Acoustics", the science of sound. With the help of a violin bow which he drew perpendicularly across the edge of flat plates covered with sand, he observed how sound waves generate geometric patterns and shapes which today go by the term "Chladni figures".

In 1967, starting from Chladni studies, the Swiss doctor and naturalist Hans Jenny (1904-1972) published the book *Kymatik - Wellen und Schwingungen mit ihrer Struktur und Dynamik (Cymatics - The Structure and Dynamics of Waves and Vibration)*. In the book (and many video-recordings) Jenny carries out all his experiments that shows what happened when someone takes various materials like sand, spores, iron filings, water, and viscous substances, and places them on metal plates and membranes vibrating by specific sound waves. Jenny turned these materials into alive and fluctuating forms, following geometric patterns created by using simple vibrational waves (pure tones) present in the audible field.

With this publication, Hans Jenny laid the foundations of Cymatics, the science studying the wave phenomena: for more than 25 years, poet, producer and editor Jeff Volk has been making Cymatics popular

by producing all the books and videos that witness the experiences made by Swiss scientist Hans Jenny. [10]

The artists who paid homage to Cymatics studies was the American composer and musician Alvin Lucier, in the performance called *The Queen of the South*. Much of his work is influenced by science and explores the physical properties of sound itself: resonance of spaces, phase interference between closely-tuned pitches, and the transmission of sound through physical media.

All the Signs around Us

All these examples show clearly how Nature is characterized, at the root, by a matrix of numbers and mathematical expressions subtending a series of physical, optical, chemical-physical, electromagnetic phenomena influencing natural forms, species, colours, sounds and structures.

And when we talk about Nature, we intend also those electro-magnetic signals interferences hitting and surrounding the Earth that are the product of turbulences triggered by solar winds, coronal mass ejections and other energetic phenomena on Sun's surface combined with ionization in the upper atmosphere of the Earth itself. Semiconductor developed a whole part of their artistic career working on audio-visualization of these astronomic phenomena. Recording a series of sound materials, captured with a ELF-VLF radio recorder, a tool capable of converting ground level natural radio signals into sound frequencies, in works such as *Black Rain*, *Brilliant Noise* and *Magnetic Movie*, Semiconductor were able to give life to these magnetic fields.

If science is considered as a complex of knowledge obtained through a methodical procedure, capable of providing a precise description of the real aspect of things and the laws by which the phenomena happen, and if the rules governing such process are generally called "scientific method", then the experimental observation of a natural event, the formulation of a general hypothesis about such event and the possibility of checking the hypothesis through subsequent observations, become fundamental elements in modern scientific (and artistic) research.

What it is today recognized as "immersive art-science" is a form of creative expression meant to rise above the notion of art as abstract representation, in behalf of a multi-sensorial experience. The historical-critical statement of this lecture, and the *Hidden Worlds* screening connected to that, is to map those audiovisual artists acting with a "discovery approach", observing and recording, sharing experiences and ideas with scientists and science communities, working without the use of cinematographic or video or digital techniques but obtaining the flux of sound and images only by natural and spontaneous scientific phenomena (physical, optical, chemical, mathematical and electro-magnetical).

Immersivity awakens a synesthetic awareness, both in the mental and in the physical space. A myriad of vibrant phenomena, usually beyond the observer's reach, are instead made reachable through an accurate psycho-physical conditioning

The Hidden Worlds Project

The *Hidden Worlds* screening, curated by Marco Mancuso, produces works that induce into a critical reflection on the existing relation between audiovisual contemporary artistic research (as regards to cinema, video and digital experiences) and applied sciences. This project, dealing with different artistic examples which investigate new expressive forms for the representation of the sound-image relation, deliberately avoids focusing on the existing common aesthetics among them, as well as on a possible expressive language. It rather suggests an overview on specific systems for sensorial perception, and emotional mechanisms of "saturation", achieved through the use of hybrid techniques, that today like never before expand the tradition of analog experimental cinema and digital audiovisuals.

The video screening takes the spectators to wonderful "hidden worlds", illustrated by artists and scientists who, more and more often, collaborate and share experiences with one another on the research of new expressive potentialities within specific mathematical processes and physical, optical, chemical and electro-magnetic phenomena.

By watching the audiovisual representation of the existing energetic and electromagnetic phenomena on the Sun's surface and of current interferences generated from interaction of electromagnetic fields between the Sun and Earth, as possible instrument of aestheticization of the space phenomena by the Semiconductor duo (in works such as *Black Rain* and *Brilliant Noise*), the passage to the audiovisual representation of chemical-physical-optical reactions of Evelina Domnitch & Dmitri Gelfand, is extraordinary short indeed. In their first work present in this exhibition, (*Camera Lucida*) they study the chemical-physical phenomena of "sonoluminescence", while in their second one (*10000 Peacock Feathers in Foaming Acid*) they analyze the potentialities of optical phenomena generated by investigating the laser light within the nanometric structures of foams.

Moreover, if the work on "chemical grams" by the video maker Jurgen Reble (*Materia Obscura*) underlines the structures born out of a film's chemical corrosion, in the same way the first work by Thorsten Fliesch present in the exhibition (*Energie!*) shows the scorches on photographic paper produced by an high potential energy flow of an electron beam contained in a cathode ray tube.

The number is also an ever present concept, being the fundamental element of every mathematical formula which involves not only a single phenomenon present in nature, but also "superimposed" interferences, beats, accumulations, harmonies and other optical event, like Moirè's (optical illusion created by geometrical sequences of interference phenomena), as shown by the purely glitch and software works by Carsten Nicolai (*Spray*).

The number, in its highest abstraction of key element for a fourth dimension representation, is an important part of Thorsten Fleisch's video (*Gestalt*), a recognition of the quaternion worlds (four-dimensional fractals) visualized in a three dimensional space through an appropriate software. Yet maybe John Campbell's masterpiece (*LI: The Patterns of Nature*) is the work that mostly evidences the geometric structures spontaneously present in Nature, through a kind of magical and hypnotic audiovisual document.

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MY LAWYER IS AN ARTIST: FREE CULTURE LICENSES AS ART MANIFESTOS

Aymeric Mansoux

Artists have the possibility today to publish their work under licenses that offer the same freedom as free software in terms of appropriation, study and modification. In this paper, I will argue that what is often introduced as a new form of artistic freedom and collaboration, is in fact a networked evolution of constrained art in which artists are turning legal documents into artists' manifestos.

Introduction

Most discussions around the influence of the free software philosophy on art tend to revolve around the role of the artist in a networked community and her or his relationship with so-called open source practices. Investigating why some artists have been quickly attracted to the philosophy behind the free software model and started to apply its principles to their creations is key in understanding what a free, or open source, work of art can or cannot do as a critical tool within culture. At the same time, avoiding a top down analysis of this phenomenon, and instead taking a closer look at its root properties, allows us to break apart the popular illusion of a global community of artists using or writing free software. This is the reason why a very important element to consider is the role that plays the license as a conscious artistic choice.

Choosing a license is the initial step that an artist interested in an alternative to standard copyright is confronted with and this is why before discussing the potentiality of a free work of art, we must first understand the process that leads to this choice. Indeed, such a decision is often reduced to a mandatory, practical, convenient, possibly fashionable step in order to attach a "free" or "open" label to a work of art. It is in fact a crucial stage. By doing so, the author allows her or his work to interface with a system inside which it can be freely exchanged, modified and distributed. The freedom of this work is not to be misunderstood with gratis and free of charge access to the creation, it means that once such a freedom is granted to a work of art, anyone is free to redistribute and modify it according to the rules provided by its license. There is no turning back once this choice is made public. The licensed work will then have a life of its own, an autonomy granted by a specific freedom of use, not defined by its author, but by the license she or he chose. Delegating such rights is not a light decision to make. Thus we must ask ourselves why an artist would agree to bind her or his work to such an important legal document. After all, works of art can already 'benefit' from existing copyright laws, so adding another legal layer on top of this might seem unnecessary bureaucracy, unless the added 'paper work' might in fact work as a form of statement, possibly a manifesto. In this case we must ask ourselves what kind of manifesto are we dealing with, what is its message? What type of works does it generate, what are their purpose and aesthetic?

The GNU Manifesto

In the history of the creation and distribution of manifestos the role of printing and publishing is often forgotten or given a secondary role. But, what would have become of the Futurist Manifesto without the support of the printing press and the newspaper industry in France and the rest of Europe? Not much, probably. So it is not without irony that one of the anecdotes often given to illustrate the motivations of Richard Stallman to write the GNU Manifesto, the founding text behind the free software movement, is tightly linked to the story of a defective printer. Indeed, very often, the origin of the document starts with a story about a problem Richard Stallman and some colleagues of his faced when Xerox did not give away the driver source code of the printer they had donated to MIT, preventing the hackers at the lab to modify and enhance it to fit their specific needs. In this case, this particular printer model had the tendency to jam and the lack of feedback from the machine when it was happening made it hard for the users to know what was going on. [1] Beyond the inability to print, and behind what seems to be a trivial anecdote, this event still remains one of the best examples to illustrate the side effects proprietary software can have in terms of user alienation. The programmers and engineers that were using the printer could have fixed or found a workaround for the jamming, and contributed the solution to the company and other users. But they were denied the access to the source code of the software. Such a deadlock is one of the reasons why the GNU manifesto was written. What is unique in this manifesto, is the idea that software reuse and access should be enforced, not only because it belongs to a long history of engineering practice, but also because software has to be free.

Looking at the text itself, we can see that the tone and the writing style used by Stallman make the GNU Manifesto closer to an art manifesto, than to yet another programmer's rant or technical guideline. As a matter of fact, we can read through the document and analyse it using the specific art manifesto traits that Mary Ann Caws has isolated based on the study of art manifestos produced during the twentieth century. [2] For instance Caws explains that "it is a document of an ideology, crafted to convince and convert." This is correct, the GNU manifesto starts with a personal story, turns it into a generalisation including other programmers and eventually involving the reader in the generalisation and explaining to her or him how to contribute right away. Caws also characterises the tone of manifestos as a "loud genre", and it is not making a stretch to see this feature in the all-capital recursive acronym GNU and the way it is introduced to the reader. It is the first headline of the manifesto and sets the self-referential tone for the rest of the text, as well as embodying a permanent finger pointing to what it will never be: "What's GNU? Gnu's Not Unix!." Furthermore, she reminds us that the manifesto "does not defend the status quo but states its own agenda in its collective concern", which is what Stallman does with the use of headlines to announce the GNU road-map and intentions clearly: "Why I Must Write GNU," "Why GNU Will Be Compatible with Unix," "How GNU Will Be Available," "Why Many Other Programmers Want to Help," "How You Can Contribute," "Why All Computer Users Will Benefit." the GNU Manifesto also instructs its audience on how to respond to the document with the presence of a final section "Some Easily Rebutted Objections to GNU's Goals" that lists and answers common issues that come to mind when reading it. Last but not least, manifestos are often written within a metaphorical framework that borrows its jargon from military lingo and for many the GNU Manifesto is being perceived and presented as a weapon, essential in the war against the main players of the proprietary software industry, such as Microsoft. In fact many hackers saw in the GPL an effective tool in "the perennial war against Microsoft." [3] Thus, when the copyleft principle, the mechanism derived from the GNU manifesto, is introduced in the 1997 edition of the Stanford Law Review, it is precisely described as a "weapon against copyright" [4] and not just a 'workaround' or 'hack'.

From the Manifesto to the License...

This particular concept of freedom, as it is expressed in the manifesto, is focused on the usage and the users of software. It will eventually lead to the maintenance by the Free Software Foundation (FSF) of a definition of free software and the four freedoms that can ensure its existence. On top of that, the GNU Manifesto is practically implemented with the GNU General Public License (GPL), that provides the legal framework to enable its vision of software freedom. It means every work that is defined by its author as free software, must be distributed with the GPL. The license itself works as a constant reference to the manifesto, by the way it is affecting the software and its source code distribution. Every software distributed with the GPL becomes the manifestation of GNU, and the license's preamble is nothing else but an alternative text paraphrasing the GNU Manifesto. This preamble is not a creative addition to the license, on the contrary the Frequently Asked Questions (FAQ) of the FSF even insists that it is an integral part of the license and cannot be omitted, thus making form and function coincide.

Even though the GPL was specifically targeting software, it does not take long for some people to see this as a principle that could be adapted or used literally in other forms of collaborative works. As early as 1997, copyleft is mentioned as a valid framework for collaborative artworks in which artists would pass "each work from one artist to another." [5] Of course, this is suddenly brought to our attention not because of the collaboration itself, but because of its sudden legal validity. Indeed the idea of passing works from one artist to another and encouraging derivative works is nothing new. For instance, back in the sixties, mail artists such as Ray Johnson even used the term "copy-left" in their work, [6] and it was possible on some occasions to spot the now very popular copyleft icon, an horizontally mirrored copyright logo, marking a mail art publication. In this context copy-left was seen as a symbol of "free-from-copyright relationships" with other artists in a way that was "not bound to ideologies." [7] In a strange twist, the use of this term is echoing years later, not without cynicism, in some reproductions of Johnson's works which are now stamped "Copyright the estate of Ray Johnson." [8]

So why a sudden interest in such practices? Precisely because of the growing development of intellectual property in the field of cultural production. At the time, under the 1976 copyright act, the only recognised artistic collaborative work was the joint work, in which it is required that all the authors agree that all their contributions are meant to be merged into one, flattened down, work. This made perfect sense in the context of the print based copyright doctrine but was clearly not working for digital environments where the romantic vision of the author is dissolved in the complex network of branches, copies and processes inherent to networked collaboration. This situation provided much headache to lawyers focused on the copyrighting of digitally born works. One of these works is for instance Bonnie Mitchell's 1996 "ChainArt" project, in which her students and fellow artists were invited to modify a digital image and pass it to someone else using a file server. In such a project the whole process and its different iterations are the work itself, not the final image at the end of the chain. The work exists as a collection of derived, reused and remixed individual elements that cannot be flattened down into one single 'joint work' and as a consequence, from a legal perspective, could neither be protected nor credited properly under the limited copyright regulations. [9] No surprise then that Heffan picked the Chain Art project as an example of artistic work that could greatly benefit from the GPL and the use of copyleft that can encourage "the creation of collaborative works by strangers." [10]

... and back to the Manifesto

Although this conclusion makes perfect sense legally, it clearly overlooks and diminishes the artistic desire to reflect upon the nature of information in the age of computer networks. Many artists adopted the GPL early on, not because of their wish to collaborate with strangers, but instead to augment their work with a statement derived from the free software ideology. For instance Mirko Vidovic used the free software definition to develop the GNU Art project, [11] in which suddenly, the GPL becomes a political tag, a set of meta data that could be applied to any work of art. By choosing the GPL as a means of creation and distribution, artists are aiming at implementing an apparatus similar to the digital aesthetics that Critical Art Ensemble (CAE) had described "as a process of copying [...] that offers dominant culture minimal material for recuperation by recycling the same images, actions, and sounds into radical discourse." [12] The weapon against copyright becomes a flagship for the recombining dreams of the digital resistance as envisioned by CAE. But by directly reusing the GPL, projects such as GNU Art failed none the less to really break through the position of Stallman that refuses to take part in judging if whether or not works of art should be free.

This is why a few lawyers, Mélanie Clément-Fontaine, David Geraud, as well as artists, Isabelle Vodjdani and Antoine Moreau, felt the need to make more explicit the artistic context and motivations of a liberated work of art by creating the Free Art License (FAL), equivalent to the popular free software GNU public License and articulated specifically for the creation of free art. [13] Suddenly, the license becomes an art manifesto. In the FAL the rules of copyleft are exposed, they stand on their own and enable the artistic creation, not for the sake of creating but as a means to produce singular and collective works. What is seen as freedom is just a very specific definition as envisioned in the GNU manifesto and that can only exist within the set of rules it represents. Moved to an artistic context, the rules to define freedom become a system to make art. In the same way that 'cent mille milliards de poèmes' was the 1961 OuLiPo manifestation of creative rules, the free art license is also a combinative manifesto, one that enables free art. It is not a simple adaptation of the GPL to the French copyright law, it is a networked art manifesto that operates within the legal fabric of culture.

Anyone who respects the rules of the FAL is allowed to play this game. Just like the ludic aspect in OuLiPo's work, and its probable root from Queneau's flirt with surrealism, artists who start to consciously use the GPL and the FAL solely for its 'exquisite' properties might start a superficial relationship with the creative process. Indeed, Raymond Queneau, co-founder of the OuLiPo reminded us already that we should not stop at the process' aesthetics itself because "simply constructing something well amounts to reducing art to play, the novel to a chess game, the poem to a puzzle. Neither saying something nor saying something well is enough, it is necessary that it be worth saying. But what is worth saying? The answer cannot be avoided: what is useful." [14] In other words and adapted to the FAL, the network aesthetics are not enough, their existence must be contextualised and positioned to escape its fate of a convenient technological and legal framework. This is why if the game aspect is obvious in the collective works that surround the FAL, we must see beyond the rules that are presented to us to perceive that such an artistic methodology aims to be an answer to the issue perceived by Chon in the analysis of the "ChainArt" project. Namely, to engage with the fluidity of information and try to turn the clichéd attitude of artists towards their unique and immutable contributions to art into a useful game. At the same time the emphasis is put on the collective nature of production and not community work.

The main issue with the intention of the FAL is that unlike the digital aesthetics modeled by CAE from Lautréamont's ideas, [15] the mechanism of a free art, against the capitalisation of culture and for the free circulation of ideas within the network can only work by making the machine responsible for this

very same capitalisation legitimate. While the mail art derivatives are happening outside of any obvious legal regulations, the copyleft art is literally hacking the system to reach a symbiosis and establish a kingdom within the kingdom. As a consequence these political works are very different from the artistic politics developed after the Russian revolution and World War I. Here, the artist is not an agent of the revolution but the vector of an 'arevolution'. A copyleft art is in the end not so much a critical weapon but instead a cornucopia that operates recursively and only within the frame of its license. Artists that are engaging with it, thus turning the license in a shared manifesto, cannot materialise an anti-culture, a counter culture, nor a subculture, they must create their own from scratch. Instead of seeking opposition and destruction of an enemy, they aim at founding and building.

Conclusion

If we look at 1897 Mallarmé's 'Un coup de dés jamais n'abolira le hasard', it is possible to only see it as an interesting visual design experiment in poetry. This approach misses the reason why this work exists in the first place. By turning art into the gathering and composing, even painting of both time and space within a text, it reached the apotheosis of parnassianism and symbolism upon which modernism broke through. [16] A similar issue of complex lineage and contextual information surrounds a document such as the FAL and leads to concurrent 'raisons d'être.' Indeed, the FAL is not just an 'exercice de style,' it is the embodiment of several elements that are announcing important changes in artistic practices: a call to turn legal rules into a constrained art system, a reflection on the nature of collaboration and authorship in the networked economy, a living archeology of the creative process by bringing traceability and transparency, and ultimately, the mark of an age of copyright and bureaucratic apotheosis that is pushing artists to develop their practice within the administrative structure of society and embed it in their creative process.

Unfortunately, and this is one of the reasons there is so much confusion and misunderstanding about the use of such licenses by artists and theoreticians, is that, with such a manifesto where form meets function, once the license is used, it triggers a process of rationalisation that leads to a fragmentation of the original ideology and intention into different, possibly contradictory, elements:

- A toolkit for artists to hack their practice and free themselves from consumerist workflows.
- A political statement against the transformation of the digital culture into what CAE calls the "reproduction and distribution network for the ideology of capital".
- A legal and technical framework to interface with the current system and support existing copyright law practices.
- A lifestyle, and sometimes fashion statement.

In practice it is possible for an artist to only see one of these facets and either ignore or not be aware of the others, making the license as manifesto multidimensional, open to different interpretations, not unlike the medium it was drafted in: the law.

Copyleft: This work is free, you can distribute and modify it under the terms of the Free Art License.

<http://artlibre.org/licence/lal/en>

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INDIVIDUATION IN GENETIC ARTWORKS AND CAUCASIAN CARPETS

LAURA U. MARKS

This paper compares contemporary genetic artworks and 17th-century carpets from the Caucasus. Both are algorithmic works that respond to new information to reach results not prefigured in the algorithm's initial state. Caucasian carpets exemplify internal differentiation, individuation. In light of Grosz's argument that art's genetic impulse arises from sexual selection, they offer criteria for meaningful individuation in genetic art.



*Carpet, Caucasus, 17th C. Pergamonmuseum, Berlin; burned in 1945, parts survive. From Kurt Erdmann, *Oriental Carpets: An Essay on Their History*, trans. Charles Grant Ellis (New York: Universe Books, 1960).*

How can algorithms produce something that looks like life — acts like life — is, “for all practical purposes,” life? This talk pursues a comparison in the last chapter of my book *Enfoldment and Infinity: An Islamic Genealogy of New Media Art*, between two bodies of algorithmic art: contemporary generative artworks and 17th-century carpets from the Caucasus. This comparison may seem *recherché*, but I think it is pertinent because these carpets are perhaps the strongest examples of analog algorithmic artworks whose patterns arise not from top-down instructions but from internal differentiation, individuation. Both genetic artworks and Caucasian carpets respond to new information and come up with results that could not be prefigured in the algorithm's initial state. A problem I find with contemporary algorithmic artworks is that their developments lack strong, interesting motivations. Thinking about carpets, with help from some Deleuzian ideas, should give us a set of criteria for how meaningful individuation occurs in genetic art.

I assume this audience has some familiarity with genetic artworks, and not much familiarity with Caucasian carpets, so I'll begin by defining both. Generative artworks are algorithmic artworks whose algorithms respond to new information, such as inputs from the environment or from users. This allows them to come up with results that could not be prefigured in the algorithm's initial state. Caucasian car-

pets hail from the Caucasus, the ethnically and religiously mixed area that, historically, intersects northern Iran, Russia, Armenia, Azerbaijan, and Georgia. In the period I'm looking at, 17th and 18th centuries, when the Caucasus was politically controlled by Iran. Based on their shared genetic structure, this talk's task is to suggest some manners of individuation that Caucasian carpets offer for, and prefigure in, genetic art.

Genetic Artworks

Contemporary artworks made with genetic algorithms introduce software behaviors into environments produced by human interaction. Laurent Mignonneau and Christa Sommerer have been working with genetic algorithms since 1992, producing works that grow and change according to users' interactions with them. The works make their connection to biological evolution evident, in that they are plant-like or insect-like: the plant forms grow and branch, and the insect-like forms grow and reproduce, according to visitors' input. Sometimes this input is as simple as the amount of time a visitor spends in front of a screen (as in *Wissengewächs*, 2007, an interactive façade for the City of Science in Braunschweig, Germany).

Life Writer (2006) uses a manual typewriter input. The characters users type are translated into forms by assigning a standard ASCII value to each character; the resulting forms "eat" the input text, growing and reproducing. Users can't know what kind of forms their typing will reproduce; however, if they interact with the work for long enough they learn that the more they type, the more growth and individuation occur. This visually pleasing work answers the question, What causes evolution? by suggesting that evolution results from sustained engagement. Still, it leaves open the question, What motivates evolution? I am not making the argument here that interfaces should be more transparent, so that users can know intellectually what results their work produces. Maybe the slight mimetic relationship between users' gestures and the creatures' changes is enough to make the work satisfying. But in this, as in many other genetic artworks, the motivation seems slim. This is why I will look first to carpets, then to philosophy, for models of strongly motivated individuation.

Carpets as Algorithmic Artworks

Here's a detail of a Caucasian carpet. See how its motifs are figurative, but don't represent any figures we've seen before: they are a little like flowers, a little like animals, a little like crystals. Commentators on Caucasian carpets often refer to their forms as hybrid, "foetus-like," [1] anthropomorphic flowers and floral animals, and populations of "archaic, headless, two-headed beasts." [2] You can see these odd creatures for yourself.

Carpets, of course, are algorithmic media, in that a weaver follows a set of instructions in order to arrive at a predictable result. All carpets have some degree of automatization: the imposed structure of loom, thread count, knot style, and design. Nomad and village carpets allow for a lot of spontaneity on the part of the weaver. The carpets I'll show, however, were made for high-level courtly and religious clients. At the beginning of the 17th century, Shah 'Abbas of Iran supported economic development throughout his realm, and this stimulus may have established commercial rug weaving in the Caucasus. The size of the Caucasian carpets shows they were woven on large looms, suggesting commercial production. [3] They were woven from detailed cartoons that specified form, so weavers did not have much room for maneuver. However, the cartoons did not specify knots per form, giving weavers a bit of leeway.

This ratio between pre-given form and slight improvisation may account for the genetic development of the forms on Caucasian carpets. Pre-given, top-down forms individuate in unforeseen ways, producing genetic mutations that shock and delight.

Caucasian Carpets (and a Turkish one): A Model for Genetic Artworks

A couple of times in *The Movement-Image* Deleuze describes how the smallest elements of “flowing-matter” are perceiving, acting; alive. We do not need to see things, for things themselves already see: “The eye is in things,” he writes, referring to Bergson, who imagined that every point has a point of view that can be, as it were, photographed: “taken in the interior of things and for all the points of space.” [4] Deleuze describes the earliest life forms as tiny machines that perceive and react: “Biologists speak of ‘primeval soup, which made living beings possible, and where forms of matter known as dextrogyres and levogyres play an essential role’: they produced micro-intervals, perceiving at one end, acting at the other. [5] Each point, then, to the degree that it resists top-down organization, is a living micro-interval that responds to its environment in unpredictable ways.

Even the most strictly ordered, hierarchical carpets produce singularities where idea meets matter. Here I show, not a Caucasian, but a Turkish carpet, that’s right here in Istanbul. This carpet follows a kind of cosmological organization, remarked by carpet scholars, whereby the central medallion suggests the beauty and divine order of heaven. See how the further we move from the center, the more unruly the forms get: they seem to possess an internal life force. I love this carpet because of the way the wacky flowers and cloud bands compete with the “transcendental” medallion. As though they’ve heard of heaven and they want none of it! This begins to raise the question, is there something in material that resists idealism, that has its own ideas of how to develop? And if so, what pushes it to develop?

Individuation

Let us define life as the capacity for individuation. While information, in-formation, is the creation of form from without, individuation comes from within. Gilbert Simondon writes that individuation occurs in a system that is metastable or out of step with itself. [6] I suggest we think of a sea or a lake as such a system. The individual form is not a final result so much as something like the peak of a wave: just a phase in process of individuation. [7] There are more potentials in pre-individual state than this individual. Becoming, then, is a mode of resolving an initial incompatibility that was rife with potentials: lots of other potential resolutions might have arisen. [8] In this awareness of the multiplicity of potentials, only one of which is actualized, we hear the resonance with theories of evolution, specifically Henri Bergson’s *Creative Evolution*. Individuation is the realization of a life force from within; the actualization of the virtual; a becoming.

Deleuze goes to great lengths in *The Fold* to uphold a free life force internal to matter that shapes it from within, each according to its capacities. He uses the concept of the univocity of being to argue that the Being of the universe is a field of unlimited potential that individuates freely, without any debt to Platonic and Aristotelian concepts of form. I want to emphasize that in fact this concept arises first in the thought of Abu ‘Ali al-Hussein Ibn Sina (980-1037), the Muslim philosopher from Bukhara whose innovative thought so immensely informed philosophy in both the Muslim world and the West. Deleuze indirectly acknowledges Ibn Sina’s concept of the univocity of being in some of his works, but the connection needs to be better acknowledged. [9]

Back to information vs. individuation. Algorithmic artworks obviously privilege information: they are formed by a pre-given set of instructions. Where does individuation occur in an algorithmic artwork? One locus of individuation is the machinic phylum of a given artwork, its particular nexus of material and immaterial production. Another is experimentation for the sake of seduction: the desire to give rise to beauty and pleasure may be the strongest provocation for individuation. Let me elaborate on these.

1. Machinic Phylum

I struggled a lot to find a source of individuation in algorithmic artworks, which would seem to be entirely pre-determined by their algorithms, until one day I saw it starting me in the face. Algorithmic artworks are not just numerically generated; they arise from nexes of idea and material that are completely particular. Given particular material, historical circumstances, drawing on existing programs that other people wrote in particular circumstances, the genetic artwork executes in a time and place that are, of course, different every time. So we can easily say that any algorithmic artwork arises from a *machinic* “assemblage” in Deleuze and Guattari’s sense of a singular nexus of ideas and materials. For example, each iteration of Sommerer and Mignoneau’s Life Writing assembles the analog typewriter interface, a text-to-form editor, the artists’ time, thought, practice, and conversation, funding from the University of Art and Design, Linz, Austria, and the actions and interest of users—in this documentation, at the Centro Cultural España in Mexico City.

Carpet making too is a machinic phylum specific to a culture, subject to its organizing principles. Caucasian carpets too arise from machinic assemblages. They required industrial-level design and production. Individuation occurred at the level of design, where it fascinates to try to reconstruct what was going on in the mind of a designer who drew an animal with eight legs and no head, for example. Individuation also occurs at the level of production, the decisions about knots per form that I think produced their genetically mutating forms. And individuation continues to occur in use.

Hence the fascination of Caucasian carpets, whose laws seems arbitrary, despite the industrial circumstances of their production. To me this suggests a lively competition between information and individuation.

Simondon offers a useful criterion for how technical production can create the unforeseen:

There is nothing essential about the made-to-measure aspect of the artisan's hand-craft. This derives from another, though essential, aspect of the abstract technical object: its being based on an analytical organization which always leaves the way clear for new possibilities, possibilities which are the exterior manifestation of an interior contingency. [10]

Similarly, in generative artwork, we may seek individuation at the level of programming and of material execution.

Seductive Novelty

We can certainly see a playful, experimental practice of pleasure in the way carpet patterns evolve. What about contemporary genetic artworks? The pursuit of beauty and pleasure seems such a retrograde motivation for contemporary art. It seems rather that genetic artworks, to the extent that the

artists aim to meet criteria for contemporary art, follow models of participatory and relational art. The artwork is supposed to change in response to some wish or need of the participant; this, in more radical versions, should be an ethical need. [11] I've interacted with any number of algorithmic artworks, genetic and otherwise, that practically begged me to invest them with meaning. But as with relational artwork, throwing the creative agency back onto the beholder or participant, demanding that we the visitors give the work its meaning, often results in random or lackluster outcomes. Such genetic works seem to follow the survival model of evolution: changes come about if enough participants select for them.

I think we need a stronger argument for what motivates individuation. What about this one: individuation arises from experimentation for the sake of beauty and pleasure! Moreover, the genetic impulse of art arises from sexual difference! This is the shocking thesis of Elizabeth Grosz in *Chaos, Territory, Art*. [12] In a brilliant feminist intervention, the Deleuzian philosopher adds sexual difference to individuation. Grosz picks up Bergson's point in *Creative Evolution* that we humans inherit all the creative solutions of other creatures from whom we differentiated at some point in evolution. [13] Bergson wrote:

The line of evolution that ends in man is not the only one. On other paths, divergent from it, other forms of consciousness have been developed," which are not as free from constraint as the human "but which, none the less, also express something that is immanent and essential to the evolutionary movement.

Clearly inspired by Bergson, Grosz rereads Darwin to argue that "survival" be construed in the broadest sense possible. Sexual selection highlights morphological differences that enhance the body's sexual appeal. Sexual display involves intensification—both of the one creating a spectacle of itself and the one perceiving. The wish to attract potential mates gives rise to all kinds of genetic inventiveness and experimentation, producing useless beauty. [14] Darwin write that the mature male stickleback becomes "beautiful beyond description," colorful, translucent, and iridescent, during mating season. [15] To attract pollinators, flowers color their petals yellow and rose and emit lovely scents. The bowerbird gathers colorful objects to decorate a stage for its courtship dance.

If we take the idea that evolution arises not from natural selection but from sexual selection, a universe of meaningful evolutionary beauty, seduction, and pleasure unfolds for us. The carpets I've shown are beautiful — and provocative, showing off their evolved embellishments much as the male stickleback shows off his colorful, iridescent skin. These observations about seductive evolution, in both carpets and nature, offer new criteria to artworks produced with generative software. In fact there are many digital and specifically genetic artworks that evolve in ways designed to keep our attention, to attract and delight us, much as the male bowerbird decorates his courtship stage. Critics often dismiss these works as decorative, not serious. But it is their ever-evolving beauty that makes them succeed. Beauty is an agent of evolution!

To conclude, I suggest that genetic and other artworks that rely on input from the user might try refining the random openness that so often motivates interaction. Further, they might try jettisoning the dreary, survivalist motives that incite "relational" interactions. Instead, retrograde though it may sound at first, cultivating beauty and experimenting with pleasure, may be the most generative of motives for individuation.

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FUTURE NORTH

JANE D. MARSCHING

This paper discusses the intersection of climate forecasting, future prophecies, and science at the North Pole in one hundred years in the collaborative video work of artist Jane D. Marsching and architect Mitchell Joachim / Terreform 1, Future North.

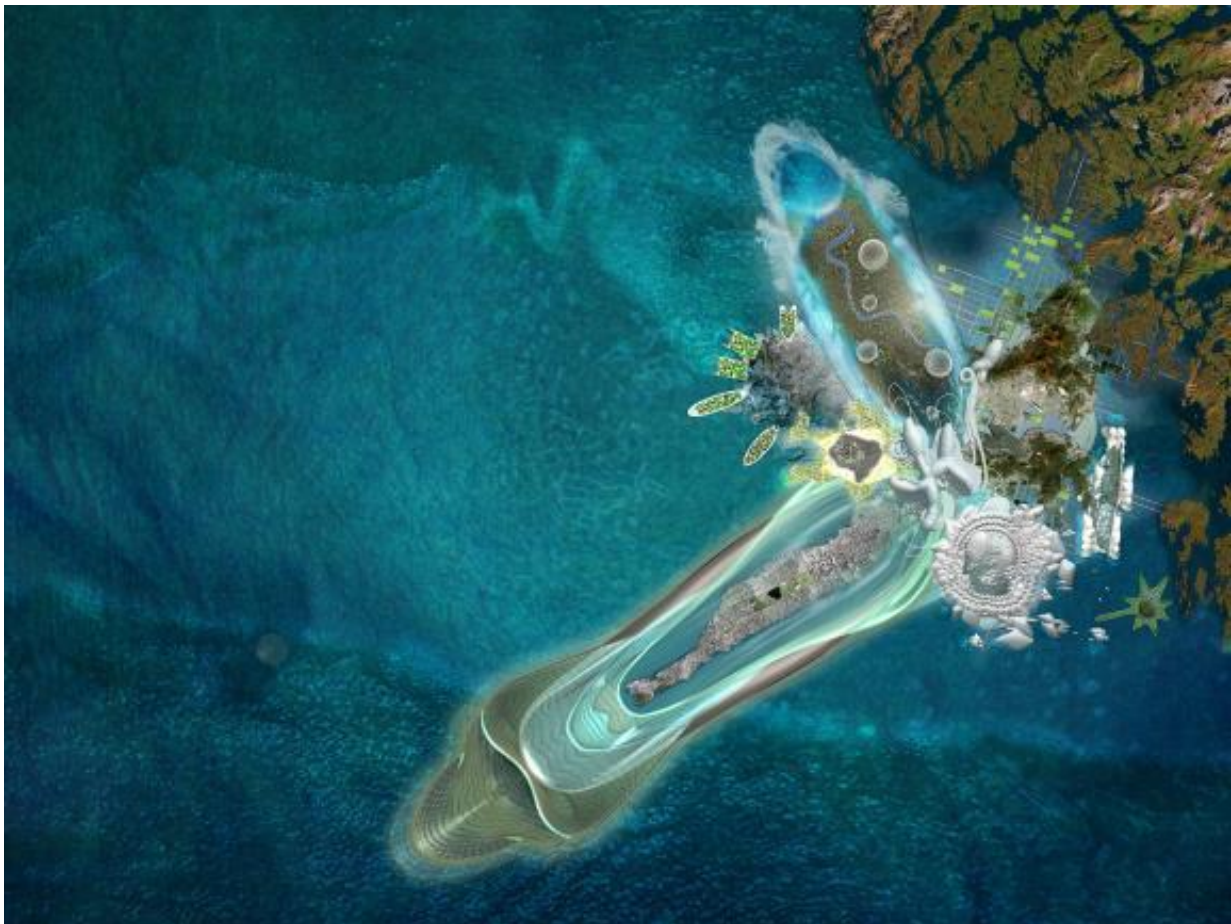


Fig 1. Jane D. Marsching and Mitchell Joachim / Terreform 1, Future North, 2008, still from 3 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.



Fig 2. Jane D. Marsching and Mitchell Joachim / Terreform 1, Future North (San Francisco), 2008, still from 3 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.



Fig 3. Jane D. Marsching, Rising North, 2007, stills from 9 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.

Time takes on a different meaning in a landscape where the sun is up for half the year and it is dark for the other half, where there is no vegetation, no fixed land, no animal or biological rhythms. If the absence of visual cues can result in odd plays with our perception, including mirages, *Ganzfelds*, and other optical phenomena, it can also result in a destabilized notion of time. Further complicating this is the fact that the North Pole ice is disappearing, a quickening process outside of our historical images of the landscape. And finally, the North Pole climate is, as discussed earlier, the harbinger of climate change to come in more equatorial zones. Its sensitive and narrow climate parameters, more affected by tiny increments of change, show us in stark relief what we are barely able to distinguish in the landscapes around us. It shows us our future, in a way, and in so doing, is an early warning system.

At the North Pole the future is brought into the now. The endless streams of data, charts, graphs, and field images chart a landscape not dying, but transforming itself irrevocably away from the one that has enthralled us for so long. The sublime unchanging wilderness is becoming shabby around the edges and full of a nervous pathos. Whenever landscapes, cultures, technologies, etc., change quickly, our culture rushes to create new mythologies, new representations, to fill the gap. The rapid industrializations of the nineteenth century with the introduction of fast-moving trains, distance-bridging communications technologies, and labour-transforming factories, created cultures fascinated by simultaneity and fractured time and visual perception, among many responses. Futurism, Cubism and other movements were experiments on the forefront as the changes took place, tracking and testing new stories and new ways of seeing.

Today we are struggling to adapt to changes in our familiar images of the North Pole. The sad icons of dying polar bears and melting glaciers don't quite encompass the complexity of the disappearance of an entire terrain, an entire cultural phenomenon. Artists are grappling with this uncertain terrain, hoping to show us what is happening and what it means to the larger world. The same work is happening in the offices of scholars and workers many other disciplines: economists, climatologists, politicians, educators, and many others. What will the future bring at the North Pole? What is the significance of its disappearance? What will it become? What will we become in its absence? In this scenario, we can translate the age old adage "as above, so below" quite literally: "as far, so near."

The challenge is to take the abstractness of these graphs and charts, the overwhelming complexity of the data, and the sense of otherness in the landscape, and to translate it into terms we can grapple with in our prosaic lives. In climatology, studies of forecasting and predicting have to evaluate the risk factors and uncertainty of these models of future events whose actual outcomes have not been observed. Looking at the future of the climate of a specific biome requires complex forecasting not just of weather, but of economic, human, and technological parameters a century from now. This is so difficult that climate modellers have determined a "sweet spot" for climate predictability in a hundred-year parameter. Our culture demands this century marker, and policy texts have used it, including the IPCC reports, the Kyoto Protocol and others. The sweet spot, "maybe between 20 and 50 years out, is where the emissions scenarios don't matter too much and where the trends start to be discernable over the noise of year to year weather." [1] The point is to think about what we can know about one hundred years from now, particularly in a terrain so sensitive to climate triggers. Climate predictability can answer that question for 20 to 50 years hence, but falls into "total uncertainty" at a century out.

If science with its sensitive data and complex models cannot provide us with a satisfactory and entirely certain vision of a future North Pole, then who can? The social sciences, such as economics, use one set of data, futurologists, inherently interdisciplinary in nature, use many sets of data but profess that the future cannot be predicted. This absence of clear vision haunts us today. We have at our fingertips and

on our screens reams of data that attempt to outline this future, but the images are hazy, or too complex, or simply too uncertain. But as the future presses down upon us more and more, as ice melts quicker, as climate triggers become more apparent, as short-term predictions become reality sooner than expected, we long for future stories that can help to frame our predicament.

One such example is the very concrete phenomenon of sea-level rise and subsequent flooding. The Intergovernmental Panel on Climate Change's Fourth Assessment Report in 2007 gives six scenarios for sea-level rise over the next century. The lowest prediction is 7 inches and the highest is 23 inches. [2] A more drastic prediction has been made by Aslak Grinsted, a geophysicist at Copenhagen University, who estimates that the sea will rise by a metre over the next century. The finding was reported, among other places, UK Daily Mirror in an article entitled: "Sea will rise 'to levels of last Ice Age.'" [3] Jonathan Overpeck, director of the Institute for the Study of Planet Earth at the University of Arizona in Tucson, modelled a 6-meter sea-level rise submerging most of Florida. This data was discussed in the venerable National Geographic in a similarly spectacularly titled article: "Warming to Cause Catastrophic Rise in Sea Level?" [4] In Hollywood, Roland Emmerich's 2009 film 2012 shows the Statue of Liberty falling in the face of the enormous tsunami of sea-level rise. Today you can find numerous transparent blue overlays of sea-level rise in your home city as you search Google Earth. In one version you can look at what happens to your area if subjected to sea levels of 1 m to 14 m. The latter amount is the stuff of Emmerich's movie. It feeds off our fears and offers a satisfying narrative.

However, a 1-meter sea-level rise has been considered in many climate models. It doesn't depend on catastrophic events such as Greenland's ice sheet melting. On the other hand, a 3-meter sea-level rise is possible, though more likely it would take two or three centuries. This would flood most of Boston and other port cities. [5] It would be accompanied by major shifts in land use, significant migration, water scarcity, and myriad other climate-induced human affects. At the same time, the North Pole would be totally ice free for much of the year, an occurrence which we are on the verge of now. At that point, transportation routes would be established and geographic boundaries clear. The North Pole would be an accessible and open ocean, with a whole range of new stories of tourism, travel, marine life, etc.

This is the scenario among so many possible futures that we picked when I approached Mitchell Joachim, visionary architect and founder of Terreform1, with the question: if we had to live at the North Pole, what would our inhabited space look like? The end result is a 3-minute animation of port cities all over the world being flooded. As they flood, they are overlaid with ecotariums, a greenhouse-like structure that would maximize energy intake, include enough land and water to create habitable terrains, and be specific to each culture and landscape. These city-ecotariums then were detached from their larger landmasses and floated up towards an open north polar ocean, where they merge into one larger, nomadic, modular global city with shared resources.

The resulting animation is paired with another future prediction for the North Pole. A colour-field animation looks at the rise in temperature of 7 degrees Celsius over the next century. Degrees are coded with colours, just as cartographers use, with cooler temperatures being cooler colours, and warmer temperatures being warmer reds and oranges. As the temperature rises (under the control of randomizing software), the colours slowly warm. At the beginning of the piece, the colours of summer temperatures are in the pale yellow range, but after a hundred years of temperature rise, the summer colours are now warm orange verging on red. At the same time, an opera singer sings the headlines from Google News from 2007 when I searched for items associated with the term "North Pole". News headlines range from the first kiteboarder at the Pole, to oil company drilling, to climate science, to watercolour classes

in a small city in Alaska called North Pole. From the geopolitical to the mundane, from science to pastimes, the news headlines create a map of the North Pole as our culture imagines it today.

The pairing of these two videos – one a minimal evocation and one a lush narrative – with an operatic aria creates a complex space where data is offered in widely varying forms, which converge and diverge over time. The story of our future is given in versions that are based on our vision of the future now, on scientific data, and on future studies and interdisciplinary imaginings. Each one of these pictures is inherently full of risk and uncertainty, or, in the language of the IPCC, low confidence and high uncertainty. But they offer provocative and many-layered sensorial experiences that catalyze wonder, that offers a possible mythology, and that transforms the abstract and distant into a story.

Finally, different stories – the myth of the “first” explorer to reach the North Pole, the hole leading to a civilization at the centre of the Earth seen in flyovers and satellite images of the planet, webcams that offer both scientific data and an elegy to our image of the icy North Pole, a vision of a possible future nomadic urban cluster comprised of floating port cities from around the world – all circle the same centre. They are concerned with a terrain that is somehow at the heart of our culture’s imagination of a mythical and spiritual north. And yet this north is changing. The more it is charted, graphed, and pictured, the more our fears for our future in the face of catastrophic climate change cling to it like barnacles. Stories are needed to tell us about what is happening and what might happen. Science, with its cautious and specialized language and graphics, can give us information. But with only data, our imaginations are left to their own devices. The work of artists and writers is to weave the data with sensory experience, with perceptions in real time and space, with human emotions and memories, with cultural histories and predictions. In these stories, we linger over what is not known, over what might be, and over that which we hope for.

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THE BANG THEORY: THE BREAKING AND (SORT OF) FIXING OF EVERYDAY OBJECTS

Luiza Martins

How might ill-designed or semi-broken objects be analyzed as to their potential to stimulate the development of new, personal and unique ways to interact with technology? Stemming from observations on faulty objects, this paper discusses the importance of an extended understanding of the aesthetics of use, misuse and individuality in the emerging theorizations of interaction design for an increasingly electronically mediated society.



Fig 1. Game Boy, 2010, Luiza Prado, Mixed media. Some rights reserved.



Fig 2. Remote and Hairdryer, 2010, Luiza Prado, Mixed media. Some rights reserved.

Introduction

“As ever more of our everyday social and cultural experiences are mediated by electronic products, designers need to develop ways of exploring how this electronic mediation might enrich people’s everyday lives.” [1]

The complex nature of human relationships with electronic devices is an extensive and rich topic for research. Its relevance to the design practice is unquestionable and discussions surrounding the topic have exhibited all sorts of positions and perspectives from authors, designers and theorists. The full range of potentialities surrounding the use of electronic objects, however, is yet to be thoroughly explored; as technology infiltrates itself into diverse, broader areas of our lives, new structures and perspectives for the design of those objects become necessary. Ubiquitous technology does need not be equivalent to invisible technology: visibility and transparency may very well be valuable strategies in the emerging theorizations of product and interaction design.

Starting from the development of an experimental series of objects aimed at bringing the inner workings behind the surface of familiar electronic devices to the foreground, the paper discusses the relevance of a deeper understanding of the aesthetics of use, misuse and individuality of an object. The questioning of the role of both designer and user contextualizes these observations.

Improvisation and Negotiation

The project began with a few simple observations on how malfunctions in everyday electronic items changed not only one’s behavior towards these objects, but the rituals associated with their use. By shedding light on the invisible mechanisms that make up the core of an electronic device, malfunctions tend to bring out previously unnoticed potentialities in an object, opening up new dimensions as to the rituals and behaviors associated with it. Leah Buechley, in her article “Questioning Invisibility”, on invisibility in ubiquitous computing and its consequences, writes:

“First, the errors are engaging – they surprise us and force us to notice technology we might have otherwise ignored. Second, they introduce legibility to technology – they reveal interesting information about how it works.” [2]

The negotiation process with a malfunctioning object can provide useful insights into the relationships we develop with electronic devices. The flaw demands one’s time and attention in order to be fixed, changed or at least ignored. Learning to deal with those flaws leads to the development of singular rituals and behaviors associated solely with the object in question, effectively transforming it from a mass-produced good into a unique device by means of its use.

The first item to be observed during the development of the project was an old digital camera. The camera presented an odd fault which would make its display either exhibit all sorts of glitches or be completely black. With time and use, however, the owner of the device discovered that for the display to work properly it only needed a few rather vigorous slaps. After becoming acquainted with this specific malfunction in the object by using the device multiple times, one’s inclination was to automatically slap the camera as soon as it was turned on, incorporating a new ritual into the set of routine actions related to the use of that specific device.

Another item of interest in these first observations was a cheap blow dryer from a generic brand. Every blow dryer has a switch that automatically turns the device off when its internal circuits reach a certain temperature, in order to prevent overheating. This one, however, had a malfunction that automatically turned the device off every few minutes when in use. At first this behavior is quite puzzling, but eventually – also, after repeated use – one learns that in order to make the blow dryer work again it is necessary to puff air into the device until a small clicking sound is heard – the switch going off again. Eventually puffing air into the blow dryer every few minutes while using it becomes a ritual, a preventive behavior against that unique malfunction.

Exploring the complexity of these relationships was the first step in the development of the project; as a natural extension of these first observations and reflections, a call for contributions was posted in a handful of social media websites and art-related communities. The subject proved to be quite popular, as almost everyone in the targeted social circles had a similar account to share. The resulting contributions exhibited a wide variety of inventive solutions and behaviors associated to the problems of each device; one of the most striking affinities between the stories, however, was the attachment most people showed to these objects, despite their malfunctions. This attachment, although clearly dependent on many factors – socio-cultural background and income among them – was deeply related to the significance the person applied to the object, as well as its history. Many contributors commented that they felt that the malfunction made their object special and unique, something that only they knew how to use.

The Objects

Continuing the development of the project, the submitted contributions were used as a base to create a small series of experimental malfunctioning devices. First in the series was a faulty Game Boy, a portable video game console originally released by Nintendo in the early 90s. The object was based on the following contribution:

“I once had a video game console that would only work when flipped upside down.” [3]

The Game Boy was thus modified using a simple circuit bending solution: a tilt sensor was connected to the potentiometer responsible for controlling the screen’s contrast settings. This caused that specific part of the internal circuit to remain open when the device was placed right side up, so that the screen would appear blank while all other functions remained unaffected. When the game was positioned upside down, however, the tilt sensor caused the circuit to close, thus allowing the player to see the images on the screen (*fig. 1*).

The second object was a TV remote (*fig. 2*). The device was adapted to fit the following contribution:

“My remote never worked unless I squeezed and twisted it really hard.” [4]

The device was modified by placing small pieces of adhesive tape over its internal button contacts, making it necessary to twist the remote and press each button very hard in order for it to work. The previously mentioned hair dryer rounded up the series as the third object (*fig. 2*). All of the objects were painted white in order to strip them of their brand names and individual attributes, instead presenting them as generic depictions of familiar devices.

With the objects ready, the next step was to observe people's reactions to their malfunctions. A few, informal tests were conducted in order to understand and recognize different perspectives and attitudes towards the devices. Since the project's aim was not that of a scientific study, the tests weren't conducted with a scientific method in mind. There were no initial conjectures to be proven: instead, the goal was to solely observe the effects and affects of an artistic experiment.

Right from the first test it became clear that most people tended to have a pattern of behavior towards malfunctioning electronic objects: twisting, plugging and unplugging, banging and shaking seemed to be part of an acquired gestural vocabulary towards glitchy items. After the first few unsuccessful interactions, however, most people tended to start a more careful exploration of the device. This second phase usually led to interesting results, with each person developing their own, individual and performative responses towards different malfunctions. Some people tried to adapt themselves to the situation by developing new ways of using the device; others tried to correct the faults with other, external solutions, like using other objects as aids and tools. It is interesting to note that, regardless of the problems, very few people stopped using the devices altogether; most tended to be amused and challenged by the objects and thus tried their best to work out a way to use them in spite of their defects.

The Aesthetics of Misuse

"Concept art is theorized as a perceptual process in which the image (concept) is experienced as an immediate presence – an art that presents to the viewer/listener an experience to be completed through the very act of perception." [5]

Building upon LaBelle's views on concept art, the design of electronic objects can be theorized analogously; the perception of the experience of use needs to be considered an integral and essential part of the identity of an object. Under these terms, the object would be an incomplete entity in and by itself: only through use the rituals and behaviors associated with it would complete the picture. LaBelle goes on to quote Nam June Paik as stating:

"In a nomadic, post-industrial time we are more experience-oriented than possession-oriented." [6]

Experience thus becomes a material in itself, as much as all tangible components that make up the physical representation of the electronic object. This set of intangible attributes, albeit abstract, is decisive in the definition of a device's identity.

During the development of the project one of the most significant questions raised by all the experiments and contributions concerned the reasons that made most people keep using malfunctioning objects, aside from the conspicuous financial issues. Electronic items with proven malfunctions can be returned to their manufacturers or sellers with relative ease; there is, admittedly, a very strong influence of psychological and socio-cultural matters that can explain the reasons for the decision to keep such an object. As a result, a multitude of answers are plausible, ranging from the object's history to its functionality; nevertheless, what strikes as particularly interesting in the research is the usual connection of this decision to live with the necessary rituals and behaviors as part of the development of a relationship with that object, almost to the point of emotional attachment to the very flaw that was problematic in the first place. What was initially considered a malfunction becomes, then, a defining trait in an object, asserting its individual identity in a sea of mass-produced goods. An aesthetics of misuse thus emerges, as an essential transformation of the individual's interaction with the object.

Reflection on imperfect objects is not a new subject in design research. Let it be noted, however, that electronic objects represent an entirely different category of objects; the rich field of possible iterations and interactions, as well as the behaviors associated with them, cause the experiences associated with this kind of object to be of a completely different nature.

Conclusion

“The most difficult challenges for designers of electronic objects now lie [...] in the realms of meta-physics, poetry, and aesthetics, [...] the post-optimal object could provide new experiences of everyday life, new poetic dimensions.” [7]

By stimulating and nurturing individualized responses and uses, explorations on the misuse electronic object can open up a new range of possibilities beyond the realms of efficiency and results. Design takes a new role, not as an instrument to the imposition of values, meanings and hierarchies; instead, by making the individualized input an essential part of the construction of the identity of an object, the figure of the user can be elevated to a new level: that of an actor. Whereas the user merely abides to an aesthetics of use already defined by the designer as the embodiment of an ideological system and is, ultimately, subdued to the machine, the actor embodies a new perspective on interaction design, where machine and human share the same hierarchical space. Dunne writes:

“According to Virilio (1995): ‘Interactive user-friendliness’... is just a metaphor for the subtle enslavement of the human being to ‘intelligent’ machines; a programmed symbiosis of man and computer in which assistance and the much trumpeted ‘dialogue between man and the machine’ scarcely conceal the premises: ... the total, unavowed disqualification of the human in favor of the definitive instrumental conditioning of the individual.’

This enslavement is not, strictly speaking, to machines, nor to the people who build and own them, but to the conceptual models, values and systems of thought the machines embody.” [8]

The actor has an active role in the questioning of this enslavement to pre-fabricated behaviors. By subverting the notion of a generic travesty of the user, the actor has the power to open up a new range of poetic and metaphysical possibilities as to human relationships with electronic objects. Growth towards a new notion of technology is, however, of prime importance, as its visibility plays a central part in the shifting of roles from user to actor. By completely obliterating visibility into the technological workings behind the surface of an electronic device a rich source of new experiences and perspectives towards the object is lost. Buechley writes:

“Invisibility is a narrow design goal. It’s not necessarily a bad one, but it doesn’t capture the full range of technological or creative possibilities.” [9]

“Why should ubicomp – or any other computing discipline, for that matter – consign itself to the ignored, invisible realm?” [10]

Marcel Duchamp considered his readymades as a response to purely retinal art, creating additional dimensions to the artistic object not yet explored at that time; taking cue from this idea, malfunctions

have the potential to respond to the perception of product design as a discipline merely focused on results, usability and user-friendliness, particularly in an era where electronic devices tend to mediate more and more areas of our lives that are less dependent on these factors.

“The electronic object does not have to fulfill our expectations; it can surprise and provoke.” [11]

That doesn’t mean, surely, that dysfunctional design should be the main goal for the development of meaningful experiences in and for itself; it is, however, a path to be explored and observed as useful and playful critique. Questioning the role of the designer as merely responsible for

“creating semiotic skins for incomprehensible technologies” [12]

is essential to the development of design practice itself.

“a ‘space’ of chains and layers of meaning between the object and the viewer, continuously expanding with no fixed origin or closure.” [13]

Understanding interaction design through Roland Barthes’ definition of text might be a useful beginning.

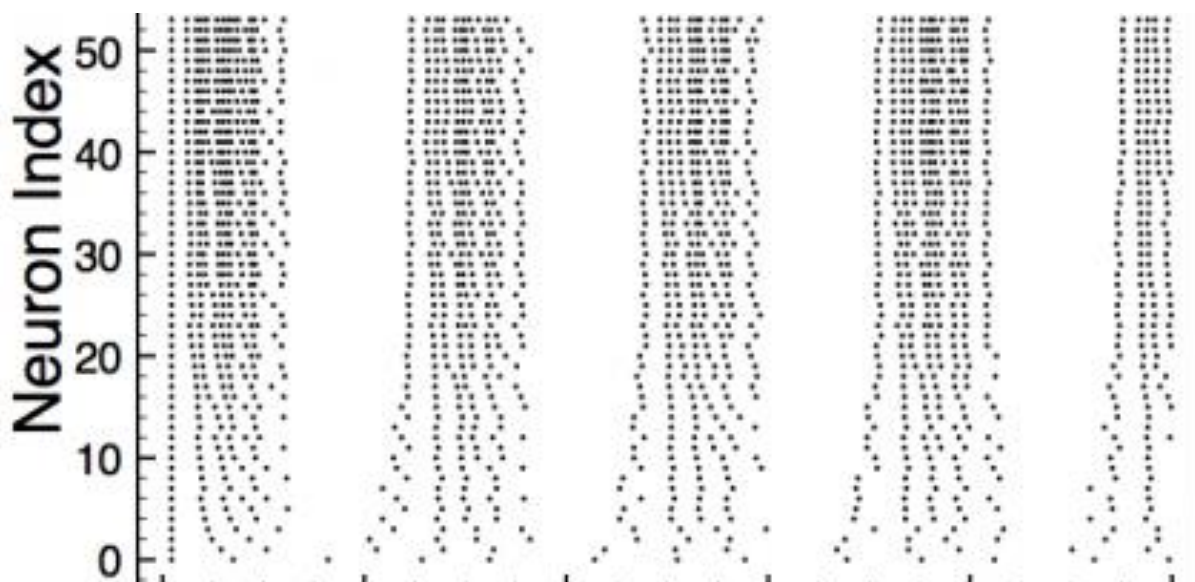
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THE SOUND OF SMALL BRAIN CIRCUITS: PLASTICITY AND SYNCHRONISATION IN THE NEUROGRANULAR SAMPLER

JOHN MATTHIAS

This paper explores some control strategies using synaptic plasticity in the simulation of an artificial network of spiking neurons in the Neurogranular sampler -a musical instrument which triggers grains of sampled sound when the neurons 'fire.'



A raster plot showing the spiking behaviour of simulation of a network of 64 neurons modelled using the Izhikevich Model (2004) copyright Kevin McCracken.

Introduction

The Neurogranular Sampler is a software musical instrument which triggers grains of live sampled audio when any one of a network of artificial spiking neurons 'fires' [10,11]. The level of synchronisation in distributed systems is often controlled by the strength of interaction between the individual elements. If the elements are neurons in small brain circuits, the characteristic event is the 'firing time' of a particular neuron. In this paper we propose how we might 'neuroengineer' the collective firing behaviour of small networks of artificial neurons and therefore also engineer the sound of the Neurogranular sampler by exploiting a counter-intuitive property of Neuronal Plasticity.

Plasticity

The term 'plasticity' in the neurosciences refers to the ability of neurons or nerve cells to adapt their connectivity according to the electrical activity of the other cells in the network. The ability for cells to

make new physical synaptic connections via axonal growth and synaptic growth and decay (synaptogenesis) is known as structural plasticity. [1] In this scenario, the axons (long tubular structures) from neurons grow towards other active cells through an induced chemical gradient, a process which has a timescale of hours to days. A different category of plasticity is known as 'Spike Timing Dependent Plasticity' (STDP) and refers to the millisecond strengthening and weakening of connections between neurons as a result of the transmission and reception of *causal* spike signals between neurons. [2]

This 'causal' effect was initially proposed by Donald Hebb and is known generally in the literature as 'Hebbian Learning.' [3] Essentially, the idea is that connections between neurons become post-synaptically strengthened (i.e in the direction of the motion of the spike signal) if the pre-synaptic neuron fires before the post-synaptic neuron. In the Spike Timing Dependent Plasticity scenario, this has been refined such that the change in the strength of connections is dependent upon the relative timings of pre-synaptic inputs and post-synaptic spikes. [4]

This continuous strengthening and weakening of neuronal connections resulting from the timing of neuronal stimulation and the relative timing of the resultant spiking behaviour coupled with the effects of the differing transit times of spike signals according to axonal topologies, has led to the idea of 'Polychronisation' (not at the same time, but in clusters). This term put forward by Izhikevich and others describes the formation of groups of neurons which fire according to particular sensual and cortical inputs. [5] A neuron can be a member of any number of such groups, meaning that it is not simply the number of neurons which is involved in neuronal processing, but the combinatorial number of possible polychronous groups, which in the human brain is a number larger than the total number of elementary particles in the Universe.

The idea that patterns and sequences of neuronal firing might be associated with particular sensory inputs has been around for a long time (see for example [6]), but it has only been relatively recently that this has begun to be understood at the level of the micro-dynamics of networks of cells. At this dynamical level, the interplay between model parameters associated with neuronal topologies, spike transit times (often called 'delays' in the literature), sensory input, synaptic plasticity and global 'noisy' inputs crucially affect the robustness and formation of polychronous groups and the associated spike timings.

These models of small brain circuits provide us with a very rich dynamical palette with which to experiment on the controlling of sound, by using the 'spike' signal of an individual neuron to trigger sonic events. Typically, in neuro-technological or neuro-engineering contexts, the spiking output of a network of artificial spiking neurons goes through an 'encoding process' and is sent to a 'motor' control, such as those which might control the movements of a robot, for example. [7] One example of this encoding process, is called 'rate coding' in which the frequency of the spikes generated in the output of the network is interpreted and used as a control parameter, the resulting behaviour from which is fed back to the network. [8] In our work, directed towards sonic control, the spiking output *is* the motor output, and in a sense the artificial neurons in our system have triple sensory, cortical and motor character. [9]

The Neurogranular Sampler

In the Neurogranular Sampler, [10] the spike signal from any artificial neuron from a number of cells specified by the user triggers a single 'grain' of sound, either from a 'live' microphone, or a pre-recorded sound file. Typically, these grains can be between 20 milliseconds and one second in duration. We can choose different kinds of neurons, which exhibit different kinds of spiking behaviour (Regular Spiking or

Bursting, for example) and choose either a homogenous group of neurons or a heterogeneous group (a selection of different types). If the group of neurons is chosen to be homogeneous and of 'Regular Spiking' variety, we find that the network of spiking neurons rapidly enters a dynamical state in which the neurons fire together –almost in synchrony (see Fig 1). In the diagram Fig 1, the firing activity in a simulated network of 64 neurons (labelled on the 'Neuron Index' axis) is shown over a period of 2000 milliseconds, or two seconds. A dot on the diagram, or 'Raster Plot' as it is known in the neuroscience literature, indicates a firing 'event' from that particular neuron. Vertical lines on this diagram indicate synchronous firing behaviour meaning that the instrument will exhibit pulse-like behaviour, the frequency of which can be controlled by a 'stretching' or compression of the audio signal. We can move away from this synchronous dynamical state in several ways; one way is to introduce heterogeneity into the system, i.e by introducing different kinds of artificial neurons. This acts as a kind of structural disorder, making the synchronous state impossible. Perhaps surprisingly, another way of moving away from the synchronous state is to exploit a recently discovered property of synaptic plasticity in small brain circuits by Lubenov and Siappas. [11]

Controlling Synchrony

Lubenov and Siappas showed that if the neurons in a network of artificial regular spiking Izhikevich neurons are all initially in a synchronous regular spiking state, the introduction of Hebbian Spike Timing Dependent Plasticity into the model network rapidly takes the network into a very uncorrelated state, in which the spiking patterns are almost indistinguishable from a random pattern (lubenov ref). As the neurons' firing times are already initially synchronised, the adaptation of relative spike times due to the changing of the connection strengths introduced by the plasticity algorithm can only have the effect of taking the spikes out of synchrony! The network subsequently gradually re-aligns itself temporally and self-organises to a state at the 'border between randomness and synchrony.' [11]

We can exploit this in our Neurogranular sampler instrument –in this way synaptic plasticity is being used as a control mechanism to 'de-synchronize' the network of neurons. It is possible to use an Anti-Hebbian algorithm [11] in order to re-establish the initial regular spiking synchronized state and we can follow the correlation in the network spiking behaviour using an 'order parameter' which is a function and a phrase borrowed from condensed matter physics.

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BENDING LIGHT: STRANGE TALES FROM THE PROJECTIVE PLANE

Alex May

This paper presents an overview of the ongoing research and art practice from the Quadratura Video Projection Research Laboratory, which is concerned with exploring the medium of light; mainly through the utilisation of video projection and mapping techniques and disparate technologies coupled with more traditional optics such as mirrors, lasers, and illusions.



Shadows of Light #2, 2011, Quadratura, video projection, Copyright Quadratura Ltd.

This paper presents an overview of the ongoing research and art practice from the Quadratura Video Projection Research Laboratory, which is concerned with exploring the medium of light; mainly through the utilisation of video projection and mapping techniques and disparate technologies coupled with more traditional optics such as mirrors, lasers, and illusions. Quadratura also develop interactive works that explore the role of the observer in art; subverting the traditional one-way communication and creating emotive interactions that can either encourage and/or discourage participation within the viewing 'agreement'.

Each project from Quadratura has necessitated some degree of in-house software development as ideas and concepts within the work have evolved. The main focus, PatchBox, is a highly complex and specialised application; an amalgamation of six years exploration into video mapping techniques. It is capable of a wide range of functionality, from performing simple affine transformations of video onto arbi-

trary flat surfaces, to dynamically mapping any combination of real and virtual geometry onto any physical structure from multiple video projectors, from multiple physical viewpoints to facilitate real-time, high resolution, digital trompe l'oeil effects.

PatchBox is designed in such a way as to be flexible enough to be used as a VJ performance tool, a rapid urban video projection bombing system, or for long running multi-screen interactive installations. However, it was never designed to be a commercial product, or indeed used by anyone outside of Quadratura. This decision has facilitated a rapid development schedule as it is not ever had to be used by a third party; rather it only has to keep pace with our artistic requirements.

Video Mapping

PatchBox was first utilised in 2007 for a large scale audio/visual installation in the historic Holland Park located in London; a major commission by Kensington and Chelsea Council. Alex May (real-time video artist and programmer) and Martin A. Smith (sound artist and composer) – who would later become the directors of Quadratura – developed a series of original video projection and lighting installations that formed a darkly cinematic narrative through the ancient wooded section of the park taking visitors on a sublime journey through life, death, and remembrance. PatchBox was used to map a multitude of different blinking eyes (looping video clips) across the canopy of a 30 foot tall oak tree from a single laptop powering one video projector. The real-time functionality allowed dynamic placement and adjustment of each video element.

More recently, Quadratura created a large scale, site-specific architectural video projection mapping for the 2011 Kinetica Art Fair in London. The installation, entitled “BioReactor”, was conceived and developed in collaboration with bio-artist Anna Dumitriu who described it as:

“A dirty wetware body, thick with bacteria and mutated by electromagnetic fields, which learns to feed off the digital technology that surrounds it, leeching energy from every data source and transforming - not only itself but also the world around it.” [1]

PatchBox was utilised to accurately map video onto the complicated architecture of P3 in London where the event was taking place. Due to the dynamic nature of the mapping system, it took just 10 minutes from turning the computer on to a final, pixel accurate alignment.

Interactive Installations

Since 2008 Quadratura have been developing interactive video installations exploring the relationship between art and the observer.

In 2009 Quadratura exhibited a series of interactive video installations in London entitled “Shadows and Falling Light.” Each installation was carefully designed to present a different form of interaction to the visitor without needing to be explained in any way. This was achieved by devising one or two simple abstract ‘rules’ per installation that would be quickly understood.

“Shadows of Light” rewarded visitors that stood still, rather than moved about. As the visitor stands still, their silhouette is slowly drawn onto the wall in a randomly picked solid colour. If they stand still

even longer they find that the silhouette will begin to act as though it is spray painted, causing drips of 'paint' to start streaming down the wall.

Conversely, "Mesh" is a constantly moving mesh of electric blue lines. Touch any of the lines and it will break them like a beam of light. The mesh will attempt to reform around any physical obstruction (the visitor). Visitors tended to slowly stop moving so they wouldn't break any more beams.

Before 2011, Quadratura had developed their own technical solutions for tracking visitors as they interacted with the work based on infrared illumination and various background subtraction algorithms. In November 2010 Microsoft released the Kinect: a peripheral designed for the Xbox 360 that featured a video camera and depth camera. By utilising the depth camera it became almost trivial to segment and track visitors. While 'Kinect Hacking' has become a world-wide phenomenon, and there have been a great many examples of artists creating and developing concepts on the hardware, Quadratura believes that it was the first to publicly exhibit a Kinect based artwork in a gallery: "Shadows of Light #2" (2011) at Kinetica, London, February 2011.

"My Robot Companion" (2011) was a series of robot heads designed to promote discussion of the ethical issues of how we might relate to robots in society, created as part of Alex May & Anna Dumitriu's collaboration as artists in residence at Hertfordshire University working with the Adaptive Systems Research Group (ASRG). Exhibited at the Science Gallery in Dublin (June-September 2011) as part of their HUMAN+ show, the installation centred around 'Charley', a humanoid research robot created by Dr. Michael Walters from the ASRG, with a stripped down Kinect embedded on its chest, and featuring a video projected head. As visitors approached the robot, it would turn its head towards them, and its face would slowly morph into theirs. If more than one visitor stood in front of Charley, its face would become an amalgamation of all of their faces. It was designed to explore how people felt about a robot that looked (progressively) like them and/or their family, and at which point the "Uncanny Valley" effect might kick in. [2] "My Robot Companion" was awarded joint first prize for public understanding of artificial intelligence by the Society for Artificial Intelligence and Simulation of Behaviour.

Conclusion

Video projection is a powerful medium; it is able to non-destructively alter the appearance of surfaces on a large enough physical scale to present the observer with an environment that can be almost entirely digitally manipulated in real-time in response to their motion, pose, and proximity. Some instances of Quadratura's interactive artwork require observation to exist in any meaningful way; although the communication between the observer and the work is allowed to evolve within the artistic constraints designed into the system, whether it is physical, verbal or otherwise. Our challenge, therefore, is one of creating meaningful communication within the boundary of the technology.

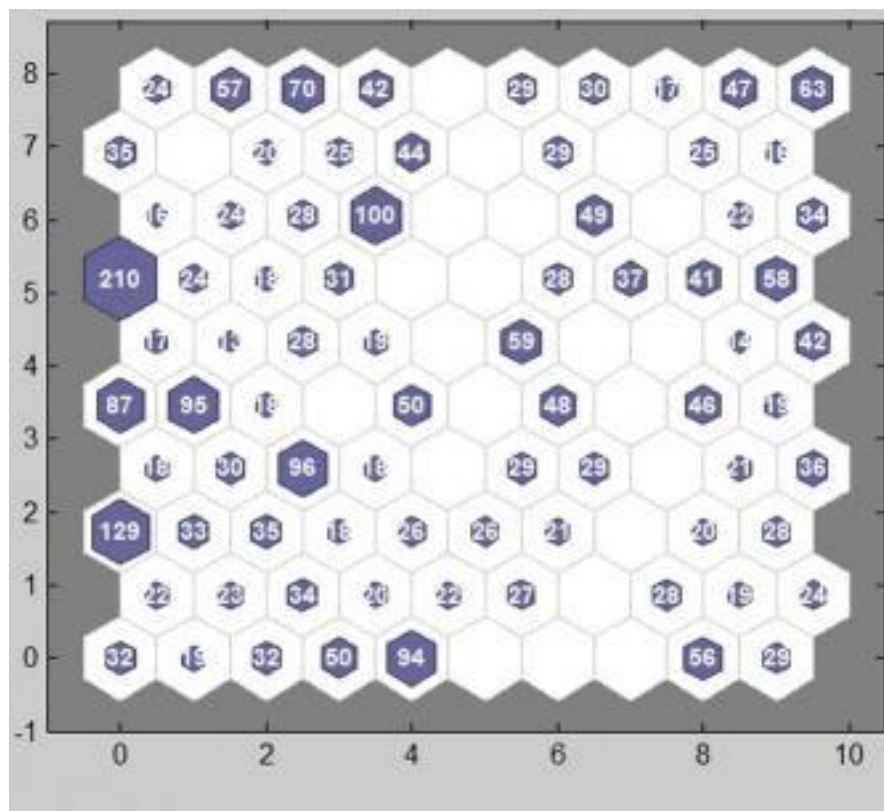
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RECOGNITION AND RESPONSE TO HUMAN MOVEMENT CONTAINED IN MOTION CAPTURE DATA USING THE SELF ORGANISING MAP

John McCormick

Neural Networks have been used successfully for recognition of human gestures in many applications including analysis of motion capture data. This paper investigates the potential for using the same methods for both recognition and synthesising responses in relation to movement contained in motion capture sequences.



Representation of the trained Self Organising Map with neurons containing clusters of similar patterns derived from the motion capture data.

This research arose from questions regarding the nature of collaboration and the use of immersive digital sound and visual environments as a component of live dance performance incorporating real-time motion capture data. Human collaborators are able to make use of their experiences and memories to respond to developmental concepts and synthesise possibilities in relation to a new artwork. If the software environments or agents were to be considered part of the collaborative process, what traits would be beneficial to them? Some form of memory would be useful, so the agent would have references to apply to incoming stimulus, or some substance with which to synthesise possibilities.

In contemplating the software agent as collaborator, even in a very limited sense, this research considered models of software that attempted to mimic human brain functions. Artificial Neural Networks (ANN) attempt to model the behaviour and capabilities of neural networks in the brain, and have been popular in the area of machine learning, including the field of gesture recognition. While there have been many successes in the area of gesture recognition using artificial neural networks, [1] [2] in human communication that recognition may often be a precursor to a response and a solution was sought that offered possibilities of both recognition and response especially in relation to human movement contained within motion capture data. There are many types of ANN however this research currently employs a particular type of ANN, the Self-Organising Map (SOM) or Kohonen Feature Map, after Teuvo Kohonen who first described them. [3] [4]

The Self Organising Map is an unsupervised form of neural network in that there is no ideal output suggested to the network, only the input data is provided. Furthermore the input data is not necessarily labelled in any manner so it is up to the SOM to find any patterns within the data and to group these into classes.

Sequences of movement were captured using both Motion Analysis and Optitrack optical motion capture systems to determine if the method was system independent. Both systems used multiple cameras to record the positions of reflective markers attached to the body of the dancer. The data was produced to represent both limb position as defined by marker positions and a hierarchy of joint rotations. This allowed testing of the SOM with the most popular representations of motion data, i.e. position data or joint rotation data. The SOM chosen was represented as a 10 X 10 array of neurons giving 100 neurons competing to classify the samples of motion data. The motion sequences were around 3000 frames long and each frame was treated as a sample by the network. Within each frame there were either 34 marker positions (the number of markers on the dancer's body) or 19 joint rotations, and each of these represented by a vector (x,y,z), so a total of 102 position values or 57 joint rotation values. Each frame containing all of these values was presented to every neuron and the one deemed to have the closest match (Best Matching Unit, BMU) is the winner and the map is adjusted accordingly. A weighting for the winning neuron and a decreasing number of neighbouring neurons are adjusted and over many iterations a weighting map is formed that increasingly matches the topography of the input data. The final map can be visualised in a number of ways, but perhaps the most pertinent to this paper is in the form describing the number of clusters or hits each neuron achieved.

Figure 1 shows the number of frames each neuron gathered as a class or cluster with similar data patterns. The patterns here, being frames of mocap data, could be considered dynamic postures extracted from the movement sequence. To test the trained network, mocap data representing a limited number of movements of known composition and length was introduced and the resultant neuron map compared to the map of the trained network. For example the main sequence contained a few hundred frames of the dancer in T-Pose (standing with feet together and arms out to form a T shape) at the start of the sequence. A short sequence of mocap data containing only T-Pose data when presented to the trained network resulted in all the frames stimulating the same neuron that contained the T-Pose samples from the original sequence. This pattern was seen when presenting other short, known movement postures to the trained network. The classification or recognition of the movement data was seen in both position and rotation datasets, though the resultant maps were different in the distribution and number of hits each neuron accumulated.

The SOM proved to be a robust method for classifying motion captured movement. It was able to create a map of movement frames which could be used to classify or recognise further incoming motion data.

More importantly for this research, it was able to create a map that could be treated as a type of memory of the dance as represented by the motion data. Traversing the map in different ways could lead to responses that are inherently related to the memory of the performed movement, but with the potential to create variations on the movement as responses to incoming motions. This is possibly analogous to the process displayed by human performers when improvising or developing movement and it is this re-synthesis or traversing of memory in order to produce movement responses that is the current stage of this research.

The results have pointed to a number of further possibilities relating to live performance. Multiple maps representing different components of the performance; movement, sound, images, could be trained and then traversed simultaneously during the performance. The use of multiple maps may be analogous to the processing of specialised information by different parts of the brain and could be used with some higher function logic to co-ordinate the synthesis of the multiple elements.

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HOW LOCATIVE MEDIA ART SET THE AGENDA FOR MOBILE LOCATION AWARE APPS (AND WHY THIS STILL MATTERS).

Conor McGarrigle

This paper argues that locative media art has had a significant role to play in the shaping of emergent location-aware technologies with this influence very evident in the latest generation of locative smartphone apps.

It is argued that this influence goes beyond superficial similarities in approach but rather represents a shift in thinking about location which has far reaching implications for the future of location-aware applications.



NAMALand, 2010

Introduction

This paper explores the connection between Locative Media (LM) a set of art practices centred on location aware technologies and current Location Based Services (LBS) and applications. To achieve this LM

will be traced to the origins of the term and to the originary ambitions driving this unique mode of engagement with emergent location-aware technologies. This involves returning to the first principles of the Karosta Locative Media workshop, its associated texts and to Ben Russell's "Headmap Manifesto" [1] to locate the intentions and ambitions embedded in the term itself.

From its inception it can be said that LM has set itself the task of defining modes of operation for emergent locative technologies. These emphasise the technology's ability to augment space through revealing layers of meanings and associations which act to foreground the rich lived experience of place. With the growing ubiquity of locative technologies I propose that LM exerted a significant influence on these unfolding technologies shaping the application of the technologies resulting in a more user centred experience which opens the technology to a wider constituency beyond the realm of specialists. This influence goes beyond the specifics of similarities in approach between particular applications and artworks, representing a shift in thinking about location which has implications for the future of locative applications.

The Ambitions of Locative Media

The term "Locative Media" originated at the Locative Media Workshop which took place in Karosta, Latvia in July 2003. The term was originally employed to distinguish the questioning artistic uses of locative technologies from their instrumentalised commercial and military uses. The proposition was that locative technologies, which had at this point only recently become widely available for civilian use, represented a fundamental shift (or the means to bring about such a shift) in our perception of geographic location. That the artistic uses of these technologies not only represented a new artistic form but had an important role to play in the opening up of the possibilities of these media to everyone. It was the embodiment of Ben Russell's prescient predictions in the Headmap Manifesto,

what was once the sole preserve of builders, architects and engineers falls into the hands of everyone: the ability to shape and organise the real world and the real space. [2]

Russell correctly identifies the potential of the convergence of high bandwidth mobile internet and location awareness in mobile devices to overlay real space with a geographically referenced layer of annotation and context sensitive information. His interest mirrors that of the Ubicomp community of researchers but his concerns focus on the privileging of user-centric practices and the aspiration that these technologies become tools for creation rather than solely consumption. This concern echoes those expressed by the creators of urban annotation project "Urban Tapestries" that practices emerging around locative technologies (in 2003) were "unnecessarily impoverished" [3] a concern which Urban Tapestries sought to address.

LM can trace its origins to the year 2000 when "selective availability", an intentional degradation of the Global Positioning System (GPS) signal accuracy for non-military users, was switched off. GPS, a multi-billion dollar space based positioning, navigation, and timing system established by the US Department of Defence and controlled by The U.S. National Executive Committee for Space-Based Positioning, Navigation, and Timing, then became a system in search of a new commercial market. Ben Russell commented that

hardware manufacturers seem to be producing devices that are as capable and open as possible, perhaps in the hope that users can tell them what the devices are for. In this sense, they seek grassroots and

consumer level interpretation of what these devices are as surely as they seek an answer from corporate users. [4]

LM can be thought of as a range of art practices which sought to reinterpret these emergent technologies as bottom-up rather than top-down technologies. [5] Ben Russell placed it squarely at the convergence of a rapidly unfurling technology and the social and physical spaces in which it is being deployed, describing it as:

a new site for old discussions about the relationship of consciousness to place and other people. A framework within which to actively engage with, critique, and shape a rapid set of technological developments. A context within which to explore new and old models of communication, community and exchange. [6]

It is this sense of a practice which seeks to engage, to shape and to set the agenda for location aware technologies which defines LM. I propose that this engagement takes it beyond a purely oppositional stance confronting what has been seen as the flaw in tactical media which "point out the problem, and then run away." [7] Through the introduction of novel practices and approaches toward technologies of location awareness, through questioning what this means and what it can mean, LM have in effect become involved in a process of shaping these emerging technologies. Lisa Parks in "Cultures in Orbit" asks "how might Western controlled satellite technologies be appropriated and used in the interests of a wider range of social formations?". Locative media offers one response.

Practices

I posit that this is due to locative media's influence on both the ways in which locative technologies are employed in an increasing range of everyday situations and fundamentally the way we think about and understand these technologies. This can be attributed to the set of user practices introduced by LM which shifted the meaning of these technologies through the privileging of user-centric modes of operation focusing on space as Lefebvrian lived space.

What do I mean when I speak of practice? At one level it can be thought of as the ways in which users engage with technology, the usage modes and habits which grow up around new technologies. [8] On a deeper level it is the ways that the technologies are integrated into everyday life which makes them meaningful and therefore useful. Paul Dourish sees the concept of practice as "one that unites action and meaning" describing "how the world reveals itself to us as one that is meaningful for particular sorts of actions". He continues "part of what people are doing when they adopt and adapt technologies, incorporating them into their own work, is creating and communicating new meanings through those technologies as their working practices evolve." [9] Crucially this process of making technologies meaningful comes through practice, it is not inherent in the technology nor can it be inscribed by designers being rather contingent on real world situations and revealed through practice. [10] The integration of new technologies into the everyday is dependent according to this account on a "supervening social necessity". Regardless of how innovative they are, technologies will not be adopted if they cannot be made to be meaningful in the context of the everyday.

The emphasis here is on what people actually do rather than what they are expected to do or are instructed to do. This can be described as tactical where "the imposed knowledge and symbolisms become objects manipulated by practitioners who have not produced them," [11] a form of resistance or

subversion. Or in a less oppositional sense as simply part of a "process by which we can experience the world and our engagement with it as meaningful" [12]. In effect it is to be expected that practices can be both, acts of resistance and pragmatic acts of appropriative assimilation.

The corollary is that practices which add meaning to a technology have the power to reposition the technology from the original intent of its creators, hastening its acceptance through shaping the technology. My proposal is that the work that LM has done in this regard is at two levels; one it has established a set of practices for engaging with location-awareness, with GPS and other location technologies and with the networked devices that are enabled by them and secondly it has caused us to think about location differently, in effect acting to "recode relations." [13]

The first consumer orientated applications of locative technologies which achieved broad appeal were satnav devices, direct descendants of their military antecedents in their approach to position. They orientated around position as points on the Cartesian grid identified by co-ordinates of longitude and latitude with the connection between the satnav unit and GPS satellites ever present. Of course this makes sense in an application designed for navigation, up to a point. As satnav gained a wider user base and became part of everyday situations so too did the anecdotal and media reports of its shortcomings. The familiar accounts of mishaps attributed variously to an over reliance on fallible technology but more cogently to an inability of the technological practices to account for real contingent local conditions. While satnav still has a niche the focus of development for location aware technologies and associated applications has shifted to mobile devices and applications which have a very different character focusing on exploring the individual's relationship with her location and augmenting that experience in a meaningful way. In short drawing substantially on locative media practitioners ambitions for these technologies and their articulation of location as Lefebvrian "lived space."

Position vs. Location

LM's articulation of location as lived space as distinct from the cartesianism of position is central to its approach. Position treats space as points on a cartesian grid identified by co-ordinates of longitude and latitude to be tracked and targeted with locative technologies ; for example as I write this at home an app on my iPhone locates me at 53°17' 22.74" N latitude, -6°8' 15.26" W longitude. Useful information if I were lost at sea, to or to be targeted by a Predator drone but it provides no information about the nature of this place, its history and the layers of association which constitute my relationship with it. In short it fails to address location as lived space and in doing so fails to build on the potential of the technology to enhance space. Location on the other hand is an "existential, inhabited, experienced and lived place," [14] the space of individuals and communities replete with histories, narratives and layers of association which imbue location with meaning which can be revealed and made visible through the application of locative media. I suggest that locative media's privileging of lived space and development of a rich set of practices building on the affordances of the technologies have introduced new thinking about location and the use of location aware devices.

Tracing Influence: The Afterglow of LM

There is much to be gained in tracing the trajectory of location-aware technologies and their public acceptance from the early GPS-centric satnav to today's smartphone apps and to unpack the nuanced but nonetheless significant differences in how they think about location and place. If location awareness is to be the nexus of mobile internet and the geospatial web then it assumes a pivotal role in the unfolding

of these technologies and their integration into the everyday. It follows then that for location awareness the practices which grow up around them are a critical contested space for the future of digitally mediated space. This fact is recognised in the ambitions of locative media practitioners.

I propose that the practices employed by LBS, particularly those which potentially have a wide user base like Facebook Places or which capture the popular imagination like Foursquare, are the agents involved in shifting the balance of these technologies from control space to enhanced space. If we follow the short trajectory of locative technologies as they move from new technologies addressing specialist user groups of military, mariners and surveyors to their current position as emerging technologies tentatively reaching a broader constituency of everyday users employing a burgeoning constellation of devices and applications we find a commensurate shift in the meaning of location-awareness.

Locative media practitioners operate within this window developing practices which are sometimes experimental and other times eminently practical which establish a mode of operating for location aware technologies which, if successful, remain permanently inscribed. Through augmenting space with location specific narratives, personal annotation, through revealing hidden histories, ludically transforming everyday space into digitally mediated game-space and developing proximity based social networking it can be said that LM projects foreshadowed all of the key areas of current location aware applications and services. Space doesn't permit a comprehensive detailing of these so I will outline a few examples each indicative of an approach shared by a number of LM works.

Consider "Urban Tapestries" (UT) the 2002-2004 research project which used location aware mobile devices to allow users to virtually annotate physical space to be asynchronously accessed by others in the locations to which they referred. The project established a rich set of practices which were researched, tested and refined. Envisaged as a public authoring platform UT consciously adopted a position as a counterpoint to what they saw as the "unnecessarily impoverished" prevailing views of the application of location aware technologies seeking to instead find out what it was about local places that mattered to people as they went about their daily routines.

True daily life is richer and more complex than the traditional view, relying as much on social networks, personal experiences, and chance interactions and connections, so pervasive computing applications should attempt to reflect this. [3]

Indeed this could be the mission statement for so many location aware mobile applications. Apps such as Color, Local Mind, Ditto, Whatser, Weddar, Foursquare, Gowalla, GraffitiGeo, SCVNGR, Yelp and Dopplr among many more share the concept of location as a social space defined by relationships and communities of interest through providing user tools for virtually annotating space. Building on the facility to quickly and accurately locate users mobile devices their focus is on location as lived space employing varying approaches and exhibiting an ambition to enhance space through fostering and building location based connections between individuals.

Similarly the practices of urban gaming, the ludic transformation of urban space mediated by mobile devices, introduced in LM projects such as Pacmanhattan and Blast Theory's Mixed-Reality games have pervaded LBS such as Foursquare and SCVNGR which incorporate game elements as well as location-based games such as Gbanga and AR games like Battle:Los Angeles. Proximity sensing familiar from LM works such as "Umbrella.net" (Brucker-Cohen, Moriwaki 2004) and "Aura" (Symons 2004), has become one of the fastest growing areas for LBS with the dating/contact apps of Gaydar, Grindr, Skout and

Whoshere standing out in a crowded marketplace. LM projects which overlaid physical spaces with narrative and sound such as "Trace" (1999), "Murmur" (2003), "34w118n" (2004) and "Media Portrait of the Liberties" (2004) have established a genre of their own with any number of location based heritage applications and commercially available apps such as those produced by companies like SoundWalks.

All Changed, Changed Utterly?

It is important to not overstate the extent of locative media's influence on location aware technologies or understate the challenges presented by the influx of development money as they enter the mainstream. These changes are incremental changes which insinuate themselves into the logic of the technology through introducing practices and ways of operating which are assimilated. They are however persistent, shifting user understanding of the technology which in turn impacts on the nature of development employing the technology. This is a process being continually renewed and challenged as new location-aware technologies emerge.

This does not necessarily result in a loss of agency for LM artworks. As illustrated by this author's 2010 "NAMALand" an augmented-reality app which overlaid Dublin with a layer detailing patterns of property ownership associated with the Irish banking bailout. The project was a popular success becoming part of the national debate on the financial collapse. From the perspective of our argument here it permanently connected emerging AR technology with activist political critique. There is a sense in LM practice that the introduction of user-centric practices responding to real needs can and have shaped the trajectory. This is backed up by a realisation that as location-aware technologies become part of the everyday they "might have been otherwise." [15]

Conclusions

It is my contention that the engagement of locative media artists with location aware technologies has changed their application in a range of everyday situations and shifted concepts of location from a GPS-inspired instrumentalised vision of positioning to a richer user-centric conceptualisation as lived space. These changes are reflected in an ever increasing range of mobile applications and services. This does not necessarily mean that Locative Media per se needs to continue, Locative Media represents a mode of engagement which will evolve with the technology. This mode of engagement, in whatever form it may take, will continue to have agency in shaping locative technologies as bottom-up rather than top-down.

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BODY AND MIND: A 3D CGI ARTIST'S APPROACH TO MRI VISUALIZATION

JOHN MCGHEE

This paper discusses the author's practice-led approach and philosophical perspective to creating images that combine Magnetic Resonance Imaging (MRI) data with interpretative 3D CGI techniques. The paper concludes that more approaches to MRI data visualization could provide an aesthetic language that offers an alternative mode of interaction.

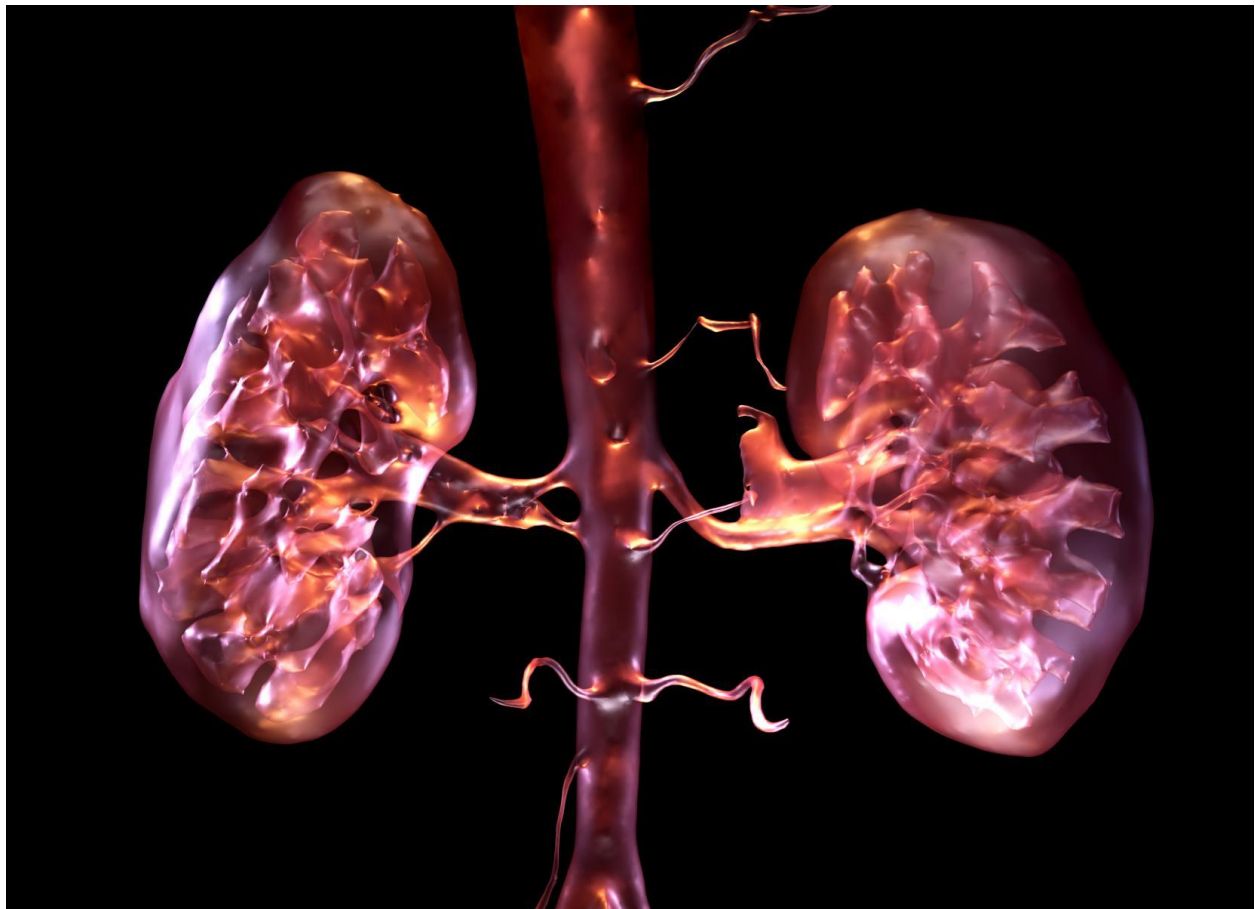


Fig 1. Kidneys. Copyright John McGhee.

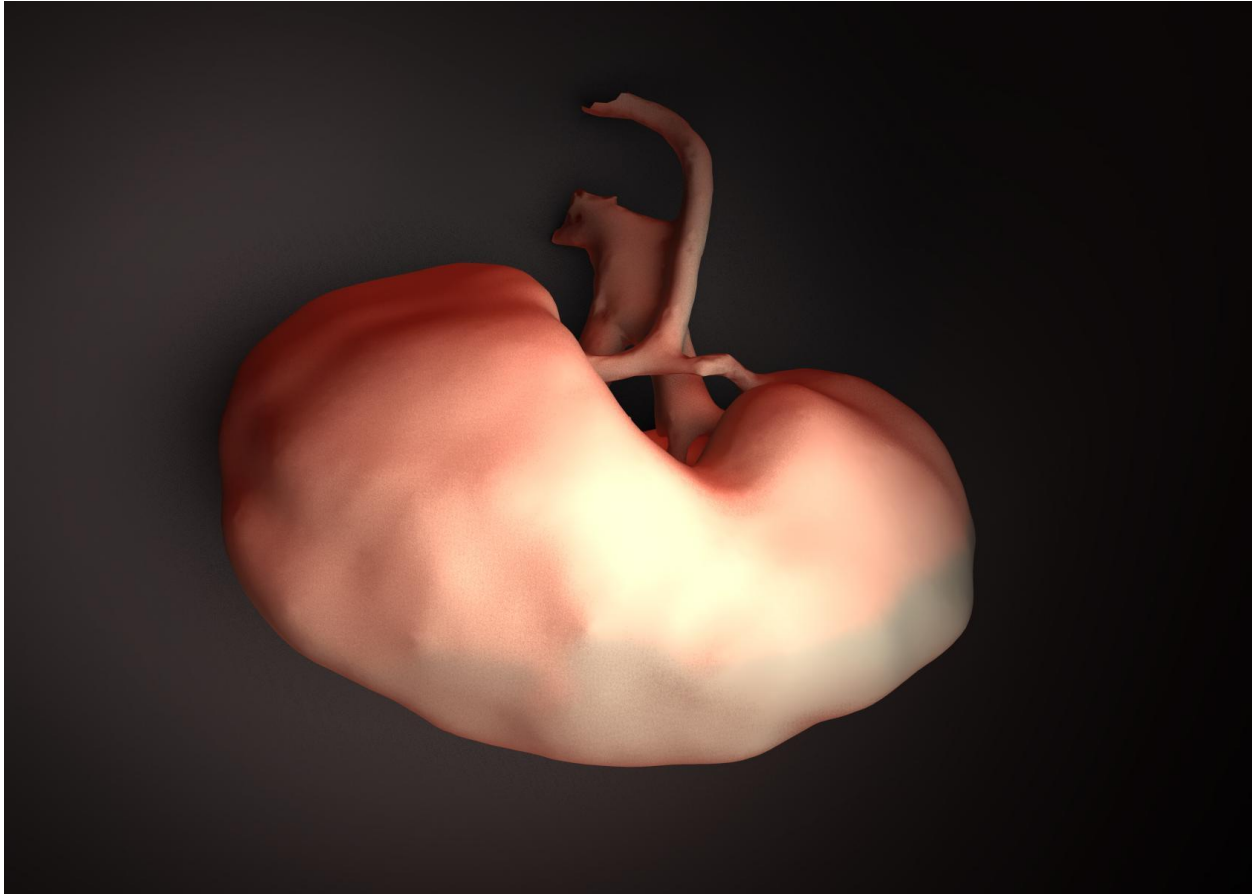


Fig 2. Isolation. Copyright John McGhee.

Introduction

Clinical imaging modalities such as Magnetic Resonance Imaging (MRI) allow the healthcare professional to explore, research and visualize our internal body structure. However the raw image data can be difficult to understand and interpret by the lay viewer. 3D CGI artists and researchers have the toolkit to widen accessibility to this type of image data.

In previous research work, the author established a pipeline in Mimics software to combine clinical MRI datasets with 3D Animation software Autodesk Maya (McGhee, 2010). Mimics is a package that facilitates the thresholding, segmentation and 3D meshing required for making MRI or CT into a surface <http://www.materialise.com/mimics/main_ENG.html>. The initial purpose of creating this hybrid approach was to develop 3D vascular images to improve patient understanding and comprehension of their vascular disease. This raises a series of philosophical questions and choices for 3D CGI artists; what is our role in creating these hybrid images? Do we act as a translator? Or should we mediate the data? In this paper the author argues that artists operating in this domain should provide new perspectives on

the data and not solely act as a conduit for scientific image dissemination. This, the author also argues is particularly relevant when stimulating dialogue between patients and health professionals.

1.0 The context

The role of the artist as scientific illustrator prevails in western medicine and has done for many centuries, whereby the artist is commissioned to illustrate for his or her scientific patron. This historical progression can be studied in germane research such as; 'Human Anatomy: Depicting the Body from the Renaissance to Today' (Rifkin et al., 2006). This type of medical anthology identifies the significant historical landmarks in medical illustration, highlighting the evolving role of the medical illustrator and placing the author's practice and research within an historical context.

Contemporary 3D computer-based animation in the field of biomedicine is a continuation of this historical timeline, providing screen-based tools to illustrate the internal body. According to Dijck (Dijck, 2005), computer 3D animation and visualization has provided artists with the apparatus to 'mediate' the human body with imagery. This 'mediated' perception as described by Dijck, has advanced into the digital age with both science and medical illustration using computer tools to virtually recreate and visualize the body. In the article 'Picture this' in the journal 'Nature' (Gewin, 2005), the medical writer Virginia Gewin identifies computer animation in biomedical science as a 'New-wave' niche. While this notion of 'niche' could be partly true, there is evidence to suggest 3D computer animation and visualization by medical artists is fairly widespread.

In Mike De La Flor's 'The digital biomedical illustration handbook' (De La Flor, 2004) several biomedical areas are cited where 3D computer graphics are applied. These include: 'surgical explanation, medical-legal, veterinary, patient education and cellular illustration'. In 'The Guild Handbook for Scientific Illustration' (Hodges, 2003), we also see evidence of the trend to move from traditional 2D methods of illustration to 3D computer animation, with an article by Mathews and Winkleman (Hodges, 2003) setting out a list of tools, materials and techniques for the 3D computer based illustration of science.

The medical animation firm Hybrid Medical Animation (Hybrid, 2010) demonstrates this emerging style. This model of production involves computer animators and artists being hired to construct a narrative to communicate a complex medical condition, a surgical procedure or the latest drug therapy. Further examples of commercial companies adopting this model include Biodigital Systems, Primal Pictures, Eye-maginations, Random42, Nucleusinc and Zygote to name but a few. However, these commercial examples often utilise edutainment as a mechanism of imparting complex biomedical information to the viewer. Edutainment mostly offers a stylised version of human anatomy and disease.

2.0 Clinical imaging aesthetic

In contrast to the 3D computer animation approaches discussed, clinical imaging refers to the acquisition of medical data, gathered from Computed Tomography (CT), MRI, Ultrasound and Positron Emission Tomography (PET) equipment. These modalities of contemporary clinical imaging apply a non-visible spectrum (radio waves and X-rays) to capture cross-sectional image slices of the human body. The term 3D medical visualization is a reference to the post-processing of this medical data acquired during scan procedure.

Medical interpretation of the body is but one stream of visualization, representing the body using a set of protocols and attributes embedded in science e.g. MRI. Radiological instrumentation describes disease in the language of science; abstract, specialist and separated from the body. In effect these images are encoded for interpretation by clinical radiologists only.

In this research the artist worked with cross-sectional MRI data of the human aorta, renal arteries and kidneys. The imagery captured by scientific instrumentation was a representation of inner body space. It is not truly a rendering of anatomy, but a translation of the body by the reactions of the tissues to the magnetic field of the scanner.

These types of radiological imagery attempt to break the body into pieces thus reducing it to understandable components, in the spirit of true reductionism. Empirical science sees the 'body as machine' a concept put forward by Descartes and Bacon and which still underpins the dominant reductive paradigm in medicine. Rosen argues: '...science is currently locked in the grip of a Cartesian tradition that asserts that organism is machine' (Rosen, 2000 p.297).

Established 3D clinical visualization in medicine is designed as a tool to support medical professionals in diagnosis, planning and training. It is a machine-based reductive form of instrumentation that is controlled, with interpretation minimised. This type of MRI imagery is absent of style, is based on reductive values and automated scientific protocols. The 3D visualization of data has some interpretation applied but is an automated and measured process, designed to minimise human intervention.

While the acquisition and visualization of MRI data generates an image that is difficult to understand for the lay viewer, it collects unsurpassed detail of internal body tissue. The medical gaze of MRI sees deep

into the body, exposing what would be 'invisible' to the visible spectrum. This clarity of vision and verifying of data, while encoded, could potentially inform and take the lay viewer to places previously unseen and unexplored. In comparison to the more interpretative approaches seen in 3D CGI biomedical animation, clinical imaging modalities offer the scientific clarity and detail that is difficult for the 3D CGI artist to achieve on his or her own.

3.0 Arts-based interpretation of clinical (radiological) data

There are individual artists who do not conform to the artist-as-illustrator of science model, and represent an alternative perspective. These visual practitioners go beyond the current notions of visualization and representation of MRI data, albeit using predominantly physical media. These individual artists are not necessarily concerned with communicating functional aspects of the inner body. The work they produce is not intended for clinical or diagnostic purposes, but for providing an alternative way of viewing the inner body for exposition. Sian Ede, the author of 'Science and Art' describes this approach as beyond the didactic: 'Artists don't 'do' prettification, product or propaganda for public understanding of science. But they can engage with it and create images, which suggest alternative ways of seeing' (Ede, 2005 p.3)

Ede discusses this reflective and experiential aspect of artistic thinking: 'If art is 'about' anything, it is a reflection of human experience in complexity and it emanates from an inventive individual with an unusual and sideways view on things, communicating with vigorous, visual acuity and daring, its intellectual content.' (Ede, 2005 p.3). The role of the artist as described by Ede cannot just be about producing imagery for 'product or propaganda for [the] public understanding of science'. Ede suggests that artists have a responsibility to produce images and artefacts that present an alternative way of seeing the world.

In the work of individual international artists such as Justine Cooper, Angela Palmer, Susan Aldworth and Jane Prophet we see an interpretative approach to describing the inner body. These artists use medical scan data to challenge and explore our perceptions of the body, as exposed by clinical imaging. While these individual artists offer 'alternative ways of seeing' their respective approaches are often more about their own personal statements and creative agendas.

In a clinical context, this artist-centric approach could be seen as inappropriate, with the space for self-expression and ambiguity being redundant in diagnosis. However, to merely produce imagery that serves science would contribute little to the field and inevitably dilute the artist's contribution.

There is evidence to suggest that purely scientific didactic approaches to disease explanation may not be the best suited approach in patient communication. Cecil Helman in his book 'Culture, Health and Illness' (Helman, 2001), describes the communication problems that currently exist in the field of doctor-patient interaction. In particular, the notion of mind and body separation is significant, as it situates disease in the context of mechanics, separate from the mind. Illness is defined by 'objectively demonstrable physical changes in the body's structure or function which can be quantified by reference to 'normal' physiological measurements.' (Helman, 2001 p.80). Medicine concerns itself only with abnormalities of the body, viewing 'physical abnormalities' as opposed to a 'patient's symptoms, their psychological state, or cultural background' (Helman, 2001 p.81). If we are to connect with patients more holistically, I would argue that utilising new visual approaches and creating images that reconnect body and mind are advantageous.

4.0 The author's visual practice: the hybrid approach

The various pathways discussed in this paper all have merit as a means of engaging differing types of audiences using screen-based media. The author proposes that the blending and combining of these modes of visualization can result in an alternative pathway for visualising medical scan data. By mixing the strengths of clinical data and 3D CGI arts based interpretation, a series of 3D CGI artefacts emerge that could facilitate a new mode of interaction. This paper briefly discusses some examples of the author's approach.

1) THE KIDNEYS - WIREFRAME EXPLORATION

Once the data is extracted from the MRI dataset, the artist is left with a 3D model of the anatomy, containing none of the colour and lighting present within real life photographic situations. This provides a mechanism for interaction, displaying a digital model in real-time. In these wire-frame renderings, I can tumble through, around and inside the 3D mesh. This familiarisation process provides me with a means of exploring the complexity of the anatomical form, as well as stimulating ideas for visual narrative and aesthetic.

This type of image is not meant as a fully rendered final shot, but provides a digital sketchbook for exploring form and composition. The image files provide me with a window into the body, although not necessarily an understanding of the body.

II) THE KIDNEYS

The intention of adding digital lighting and colour to the wire-frame model is not to inform the viewer of the mechanical processes involved in blood filtration, but to start to develop an aesthetic language for communication. Using CGI lighting, a visual quality is applied that renders the image more like glass than soft organic tissue (Figure 1 - Kidneys). The transparency used in the render of this image provides a simulated optical effect that shows a structure within a structure. This aesthetic style translates the human kidneys into a screen based digital artefact with an alternative approach to the reductive.

In a separate piece of work a virtual camera was placed inside the aorta. A cave-like interior starts to emerge from the data, as the model is rotated and digitally surveyed. This suggests a feeling of isolation within a very large passageway or tunnel that winds its way through the human body. This stepping inside the aorta enabled me to explore yet another engaging structure, within an overarching complex form. By placing the viewer inside the structure, a sense of audience participation is introduced, challenging the viewer to explore this vast space further.

III) ISOLATION

The inner human body is completely devoid of daylight. It is a space that functions in constant darkness, only ever illuminated by the non-visible spectrum of MRI and X-rays.

Building on further exploration from the same dataset, a single kidney was isolated from the rest of the form. The kidney was rendered using a more diffuse and scattered lighting technique (Figure 2 - Isolation). The form takes on an almost foetal like position with a warmth to the surface. The essence of this image is to convey the sculptural form of the human kidney, isolated from the body.

5.0 Concluding remarks

This paper puts forward the idea that 3D CGI artists can combine clinical MRI data with a more arts-based approach. The goal of this combined approach is to develop a new visual aesthetic. The application of this type of work transcends the gallery space, offering digital imagery that could stimulate dialogue between health professionals and patients; an impartment of information beyond the purely functional.

It could be argued that this is not a new approach. The early anatomists saw this philosophical stance as the norm. The Renaissance humanist and Professor of Anatomy at University of Padua, Andreas Vesalius

(1514-64) published seminal work, entitled 'De Humani Corporis Fabrica Libri Septem' (The Fabric of the Human Body in Seven Books) (Vesalius, 1543). This provided the first detailed published anatomy book in western medicine. Vesalius believed in the humanist notion that images embody an idea and offer meaning beyond words. This work revisits this approach, in developing a contemporary visual language for potentially improved patient interaction and communication.

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ANIMATED GRAPHIC NOTATION

Shane Mc Kenna

This paper discusses the authors' use of animated graphic notation to encourage collaborative music making for a wide range of performers with different musical backgrounds. In terms of notational reform this essay will ask two important questions with reference to the author's work: What are the problems with the old notation, both traditional and static graphic notation, and what is useful about new forms of animated notation.



Fig. 1 - Combination of audience and instrumental notation.

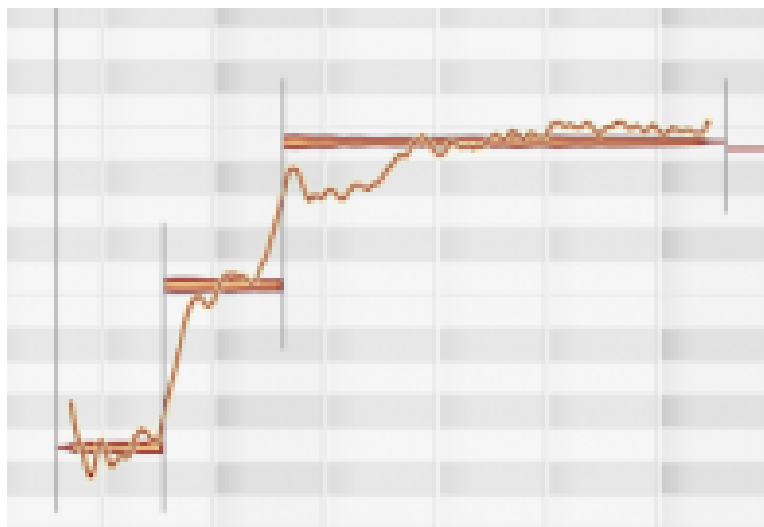


Fig. 2 - View of Melodyne with pitch shown on the vertical plane and time on the horizontal plane.

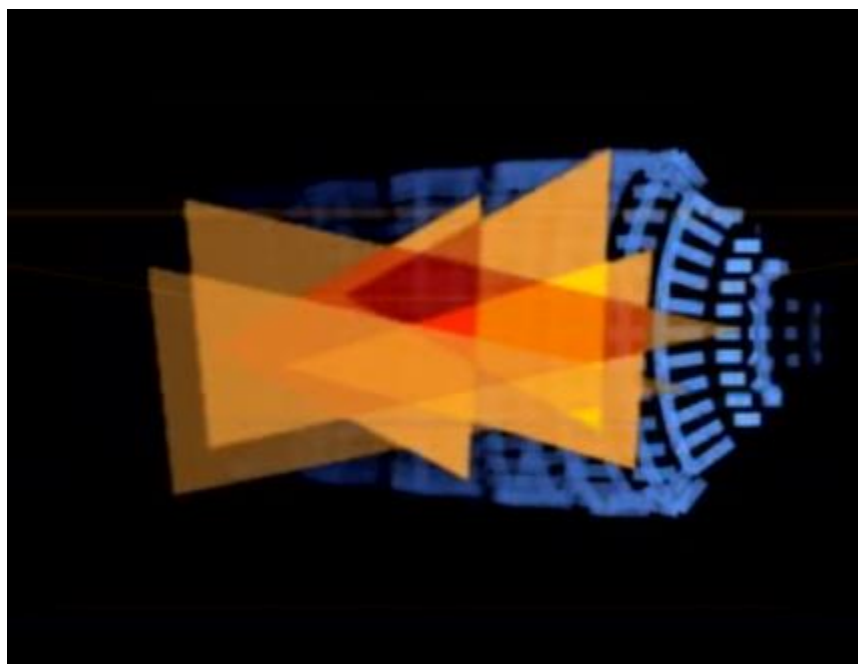


Fig. 3 - Notation for orchestra

Origins and Motivation

As a music maker and music teacher the main aim of my work has been to create genuinely accessible musical experiences, which invite participation based not on musical experience or training but on a simple willingness to take part. This approach arises from the view that music is a fundamental human activity, which forms a part of all known human cultures past and present [1] and which not only satisfies our creative urges but plays an important role in our personal and social development just as it has in our evolution and survival [2] as a way of promoting cohesion through collaborative experience. In western art music the development of notation lead to a gulf between those who take part in music - performers and composers - and those who simply listen - their audience. This has been reinforced by a music education system which concentrates largely on music and notation of the past without giving due attention to the development of musical ideas in contemporary music and to notational reform. The use of graphic notation in education has been shown to encourage creative thinking, collaboration and ensemble performance, while also dealing with general musical concepts, which apply across many genres and styles of music. [3] From my own experience of using graphic notation in the classroom, and as a compositional device I began to develop a system of animated notation, which would further serve the idea of creative collaboration and accessible music making.

Notation – The Western Tradition

Conventional music notation represents a system of communication between composer and performer which has been the basis of musical creation in the western world for hundreds of years. The writings of Guido of Arezzo from the eleventh century reveal that notation was used to record and preserve music and to provide performers with a memory aid to assist performance. [4] In *Micrologus* (ca. 1025-28), which drew on the theoretical studies of the ninth century, *Musica enchiridiadis* and *Scolica enchiridiadis*,

we also see the development of a fixed system of notation giving rise to the study of music as a theoretical language. With the refinement of this notation came the opportunity for composers to create polyphonic works for a number of musicians reading independent parts, replacing the single line melodies sung in unison, which had previously dominated. These developments allowed for the thoughtful organisation of music, which calculated the effect in advance of the performance and provided an exact timetable for the coordination of different parts. An in-depth knowledge of notation, and the musical theory needed to decipher it, became a pre-requisite for becoming a musician and certainly for becoming a composer. A hierarchical structure developed in western art music with the composer instructing the performer for the benefit of the listener, creating a situation where all of the musically uneducated can listen, few can perform and even fewer compose. If we consider listening to be the most vital and beneficial part of the musical experience then this system is justified. If we consider participation in music making to be the most vital aspect, then this system must be questioned.

Animated Graphic Notation

The evolution of graphic notation in the 1950s was, in part, due to the perceived failure of conventional notation to adequately represent the growing range of sounds and performance techniques being explored by some of the more innovative composers. In the 1920s work like *Hyperism* and *Ionisation*, by Edgar Varèse, liberated composition from melody, harmony, rhythm and regular pulse, ideas easily represented using conventional notation. The growing use of unpitched, non-western instruments and electronic sounds exposed the limitations of notation to accurately represent these imaginary sound worlds to be produced in live performance. Graphic notation allowed composers to create musical scores which would represent their ideas but which needed the collaboration of the musicians to produce the desired sounds. This implies a new composer/performer relationship, where the composer relinquishes some control over the resulting sound, alternatively trusting the musical instincts of the performer. The focus of the score now shifts from being an accurate timeline of sound events, which the musicians must produce, to a communication of a musical idea to be interpreted.

One of the great advantages of conventional notation is the control it offers the composer over durations within a piece. With the help of trained performers, composers can create rhythmically complex works with large ensembles, where every detail of the musical timeline is precisely arranged in advance. This is only achievable after establishing conventions of rhythmic notation as standard amongst composers and performers. With static graphic notation, the lack of objective rhythmic conventions often leads to both indefinite rhythm and unknown duration of many graphical pieces. Animate graphic notation allows for intuitive and clear cues for durations and for dividing sections of an ensemble using visual parameters, like colour and position on screen and although it is difficult to emulate the precise rhythmic nature of conventional notation, visual rhythms can be easily used to indicate pulse leaving the precise rhythmic interpretation up to the performer. Much of my work, which will be discussed later, chooses to leave the final decisions of rhythm, pitch and timbre to the performers with the notation designed to supply enough information to communicate a musical idea without specifying a musical sound. This type of animated notation allows each score to be accessible to a wide range of performers, with different levels of musical experience, and to be open to different interpretations from ensembles of all sizes.

Research, Performances and Installations

In April 2008, two experimental electronic artists, one cellist with a looped effects unit, a classical trombonist and clarinet player, a number of percussionists and around forty audience participants as vocalists, took part in my first experiment with animated graphic notation for a large ensemble in The Bernard Shaw venue in Dublin. None of the performers had seen the score before the performance so the ensemble was divided into three sections: the vocalists followed the white parts (mainly letters like 's' and 't', for texture and percussive sounds); the acoustic instrumentalists followed the blue yellow and orange sections: and the electronic performers interpreted the background video elements (Fig. 1). The notation for *The Score* in the Bernard Shaw resulted from a number of months of experimentation with simple animated shapes and video footage mostly concerned with changing scale and visual rhythms and the use of colour to divide up sections of an ensemble. The performance worked extremely well as an example of collaborative music making with an ensemble of performers who hadn't rehearsed, many of whom were not familiar with graphic notation. The diverse range of performers working closely together as part of a spontaneous musical experience was the most encouraging part of this early experiment and much of the notation used here was adapted in the next stage of research, involving a more scientific approach.

The next step was to create an installation piece which invited people to give a vocal interpretation of a short animated graphic score, each in isolation and without hearing the other participants' interpretation. A mixture of participants with different levels of musical experience were chosen; from professional classical musicians to participants with no musical training. Their interpretations were recorded, analysed and used to create a layered backing track for a live multimedia performance in 2008 entitled *Three Streams*, a piece that used the same animated notation interpreted by trombone, cello and percussion. The score for the installation was divided into a series of animated shapes and symbols, which repeated three times. The first two were a line of 's' and 't' shapes moving across the screen used as an example of a socially learned symbols which are easily interpreted as vocal sounds. The symbols and shapes gradually became more abstract and with more complex movement in order to explore the instant oral response to the visual parameters of changing scale, movement, texture and position (in relation to screen position and to other symbols). These visual parameters were expected to influence the dynamics, duration, timbre and pitch of each interpretation.

Great lengths were taken to animate each part of the notation in a way which could be instantly interpreted by using changes in opacity (fading in and out) and screen position to mimic the forward reading that takes place when a musician sight-reads conventional notation. When sight-reading the brain does not simultaneously absorb individual pieces of visual information, process it and control the motor functions that make the sound. Instead, the reader takes in large amounts of information within the visual field in what are called fixations. [5] Each fixation involves looking forward but also looking backwards (regression or backwards fixation) which is represented by fade in and fade out in this system of this animated graphic notation. The analysis of the recordings, which included forty individuals, showed similarities not only in the interpretation of socially learned symbols like letters but also in the response to abstract shapes. Similarities in participant's pitch, duration and even timbre suggest that certain visual parameters are objectively linked to sounds and that a common musical language exists between the participants, which may be socially learned but is not a product of musical training. A notable feature of these vocal interpretations was the lack of discrete pitches used throughout, with a complex combination of sliding pitches more common, making it difficult to analyse the exact pitches used (Fig. 2). The performance, which followed the installation, was a combination of the layered installation recordings with live interpretation of an extended score. This was projected for the

musicians and the audience, many of whom had participated in the installation, providing an intimate insight into the performance and composition of the piece.

Pulsing Shapes Colours

My 2009 piece *Pulsing Shapes Colours* was created to explore the use of animated graphic notation to create a spontaneous performance for orchestra introducing each section separately, with each following a different colour, but with a combined sense of pulse drawn from visual rhythms. No member of the orchestra had previously seen the score so the notation was designed to be easily sight-read using a small number of repetitive pulsing shapes, which fade in and out over eight minutes. Each one of these shapes contains both a simple pulsing rhythm and complex inner rhythms, which may be interpreted in different ways (Fig. 3). This was designed to keep the individual performers and each section linked into a common pulse while allowing them the freedom to explore different rhythms, from the visual rhythms on screen or from listening and mimicking each other. Each section of the orchestra was given a different part of the score to follow: The piece begins with brass and upper strings, followed by lower strings responding to any red parts of the score and woodwind following the red/orange section. The percussion were given free reign to pick up on any interesting rhythmic parts they saw on screen or heard from the rest of the orchestra. No performance instructions concerning pitch, performance techniques, rhythm, timbre or dynamics were given. The members of the orchestra, who had been chosen through audition as the most highly accomplished musicians of their age in Ireland, seemed to relish the chance to perform freely without the level of instruction and direction they were normally accustomed to. Yet as soon as the lights went down and the animation began – which was projected onto a huge 20ft screen – they became immersed in a new musical experience where they were given the freedom and the combined responsibility for shaping the sound of the piece. The orchestra continued playing for ten minutes after the piece had finished, taking advantage of the opportunity to explore orchestral sounds in a spontaneous and improvised manner.

Three For Four

Three for Four was created for the Irish Composer Collective and performed in Sonic Arts Research Centre, Belfast and the National Concert Hall, Dublin. The piece uses just three simple shapes: lines, circles and triangles, in four colours moving in different ways. This piece was originally created for string quartet and was performed as part of a concert with a traditional audience/performer setting, with the exception that the performers were positioned side-on to the projection on stage so they and the audience could see the score clearly. Although in this type of concert the audience is not directly involved in the music in terms of performance, they are given an insight into the piece through the projected score. As was suggested in the installation piece for *Three Streams* a subjective connection between certain moving shapes and symbols exist so that the audience can understand the interpretations of the performers. *Three for Four* was also used to explore the versatility of animated graphic scores by recording a number of different interpretations from different groups including New Dublin Voices (a thirty-piece choir) and jazz pianist Johnny Taylor. Each section of the choir – soprano, alto, tenor and bass – followed a different color while Johnny Taylor recorded a separate layer for each colour, working within a loose harmonic progression for different sections and assigning certain themes and motifs to shapes and colours. Each of the three interpretations were used in an interactive installation where the score was repeated on a loop and the passing audience members could use three faders to mix the recordings of the individual interpretations together. Although none of the groups heard the others interpretation and there was no discernable connections in choice of pitch in terms of

traditional harmony, the subjective connections between moving shapes and sounds create a relative movement of pitch, dynamics and duration which compliment each other in the same way the orchestra found a common sense of movement. The choir recording also had a strong connection to the recordings taken as part of the Three Streams installation. Although New Dublin Voices are a highly trained and experienced group of singers they rarely rested on discrete notes with their undulating pitch and rhythm showing many similarities to the individual *Three Streams* recordings.

Conclusions

Over four years of performances and recordings have shown that animated graphic notation is an effective way of creating a shared musical experience through creative collaboration. Over 200 performers have taken part in these pieces ranging from experienced noise artists, jazz and classical musicians to amateur musicians and participants with little or no musical training. The connections between all of these performances indicate an understanding and ability to create musical sounds, which use dynamics, pitch, durations and rhythms, that may be socially learned but appear not to be based on musical training. It is the role of music education to encourage and nurture this shared musicality for the benefit of the individual, the group and of musical culture in general. For composers and musicians, new notation presents opportunities for working in more collaborative, accessible and versatile ways, which encourage participation in musical activities beyond the listening experience. The advantages of using animated graphic notation to add structure, encourage creativity and provide a focus to ensemble performance makes it an important element of current notational reform.

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TOWARDS CO-AUTHORING COMMUNITAS: CONSIDERING THE POTENTIAL OF DIGITAL ART PROJECTS WITHIN PLACE-MAKING AS A PROCESS OF BECOMING

Anita McKeown

Digital technology, particularly the internet, "a natural environment for liminality" (Waskul 2004,40) in conjunction with open source software / culture are considered as tools for the creation and production of liminal phases / liminoid spaces. Could such digitally produced spaces produce *communitas* and if harnessed within place-making, encourage a process of 'becoming' both for the project participants and place involved.

Aristotle's belief that humans were a mix of matter (constant) and form (constantly developing) contributed to his understanding that humans have an "innate capacity for action: to change the world to his or her whim (*techné*), the ability to move from sheer possibility to actuality." (Brommage 2005,11) This process of change from a lower level of potentiality to the higher level of actuality is known as becoming. Maslow referred to this process as self-actualisation, or to become more and more of what one is, or capable of becoming. Within Jungian psychoanalysis self-actualisation can only fully occur once the process of Individuation is complete.

Individuation is the transformational process of integrating the conscious with the personal and collective unconscious (Jung, 1962, p. 301). Through Jungian psychoanalysis, a period of reflection and transformation is undertaken during which, the essential personality of the person, their individuality can emerge. Jung believed this resulted in a profound healing effect on the person (Jung 1962, p. 433). This process often occurs within a particular context or setting separate from but in parallel with the mundane, everyday life of the individual, a context, which could be referred to as liminal.

The term Liminal derives from the Latin *limen*, or threshold and was first used by Arnold Van Gennep (1909 translated to English in 1960) in *Les rites de passage*.¹ Here Van Gennep discusses three stages that accompany the 'movement from one cosmic or social world to another' (Madge & O'Connor 2005, 93), separation (preliminal), transition (liminal) and reintegration (post liminal).

During the pre-liminal stage an initiate is separated from their usual social environment and what has been their way of life and its related beliefs to date. They then enter the liminal phase, which signifies for Van Gennep, a ritual space of transition. Here the initiate's pre-conceived ideas and beliefs are challenged through the extra-ordinary experience of initiation, followed by the post liminal phase. Within Van Gennep's rationale, during the post liminal phase the individual and their initiatory knowledge is re-integrated into the general society.

The anthropologist Victor Turner (1967) in his often-cited text 'The forest of symbols' picked up on Van Gennep's ideas and re-defined them within the context of 1960s counter culture to develop a new anthropological perspective on liminality. Turner, argued that in order for the process of becoming / self-actualisation to take place the dissolution of the normative values or understanding of one's self and

context is necessary (Turner 2008). For Turner, this dissolution, occurring during a liminal phase, although initially destabilising, could create an environment conducive to the individual's values and normal modes of behaviour being reflected upon and transformed.

For both Van Gennep and Turner the liminal state signifies a time of transition albeit manifesting differently, a 'time out of time' where one is 'betwixt and between' (Turner 1967,) not only social status but also social mores and beliefs. Where Van Gennep discusses the phases as part of a ritual process, Turner deviates, taking the idea of the liminal into secular contemporary societies; spaces he identifies as liminoid. Turner proposed (1982, 32) that liminal spaces could not be applied to 'modern societies' as they are for the most part secular. Liminoid spaces have similar qualities and functions but are not part of a spiritual or initiatory journey with no rite of passage. It is Turner's evolution of the liminal into liminoid, which holds fertile potential for digital arts practice to contribute to a process of becoming through the practice of place-making.

Place-making is a community-driven process of people making a place and strikes a balance between the physical, the social and what could even be considered spiritual qualities of a place. (PPS 2011). This process, returning to Aristotle's understanding could be re-considered as a process of becoming, 'moving from sheer potentiality to actuality'. If we employed digital media/technology as part of this process, this could also be an opportunity for self-actualisation. The creative use of digital media / technology could be used to deconstruct an understanding of a location, a reflective and transformative process by residents, which could manifest as an essential personality inherent within the location.

Turner when explaining the essence of liminality stated it was "found in the release from normal constraints" adding that; liminars were individuals who had the power to "reveal the freedom, the indeterminacy underlying all culturally constructed worlds, the free play of mankind's cognitive and imaginative capacities" (1969 161). Contemporary cultural theory reconsiders Turner's notion of limen or threshold within the notion of the border. Indeed it has been argued, (Rosaldo, Ortner et al) that Turner's vision is somewhat Utopian and in fact that rather than being re-integrated into the status quo the individual may in fact seek to change it. Turner identifies "Ritual Liminars or Edgemen" who "possess the 'radical potential of cultural critique, indeed of deconstruction,'" (Turner 1969, 128) yet for the most part Turner's ideas lean towards re-integration to society in a similar vein to Van Gennep.

Weber considers the liminal phase to be simultaneously "culturally dangerous but culturally creative," (1995, 526) a place of action. As the cultural beliefs are challenged and broken down any re-integration may include an inability to conform to the previous value system, yet this may in turn contribute to the creation of new systems.

Digital technology, particularly the Internet, "a natural environment for liminality" (Waskul 2004,40) and open source software / culture can be considered as tools for the creation and production of liminal phases / liminoid spaces where a constant cycle of de / re -construction takes place. Technologies often referred to as new / digital Media, in particular the Internet / cyberspace have as defined by Flew (2008) the following characteristics; they can be manipulated, are networkable, dense, compressible, interactive and are perceived at least, as immaterial. It is these qualities, that create the in-between or threshold states, reminiscent of the liminal phases Turner and Van Gennep referred to, the liminoid spaces that could be utilised within the the processes and practices of place-making.

Projects that use these technologies in particular the internet or cyberspace can be considered from this perspective of in-betweenness or threshold space as any activity undertaken cannot be separated from

our pre-liminal understandings or connection to our embodied experiences and practices. Whilst we can transcend the physical limitations of time and space momentarily, we enter this space from a corporeal position and always return to our corporeal world and all that entails.

Pratt 2002; Walmsley 2000 highlights this in noting that 'communities and forums that exist online are still rooted in place and space whether that is a physical location or a space of shared interest, being human they can be rooted no other way. Whether as the creation of bits, the use of the Internet, either through social media, virtual worlds or simply searching for information, the virtual and corporeal are all part of the online virtual experience. We cannot separate from our physical world and the disruptions of presence / absence, mind / body on and offline are all part of this dualism.

This dual nature has social, cultural and political implications with geographers increasingly examining what Kitchin refers to as "the role of space and place in a distributed social space that lacks physicality" (1998a, 393). I propose that it is this very lack of a fixed physicality and the momentary transcendence or disruption of physical limitations that can be exploited for the deconstruction or undoing of understandings of place and a co-authoring of *communitas*. The identity of a place is not fixed, with individuals having a personal, subjective understanding of a place and knowledge that could be viewed as assets for change and evolution, personal and locational.

Turner's relating of Van Gennep's ideas to a secular contemporary world incorporated what Weber (1995, 527) calls "the shifting unfolding, processual, dynamic dimensions of cultural change: the shifting relations among liminality, *communitas*, and structure." The dictionary definition of *communitas* refers to "an unstructured community in which people are equal" or 'the sense of sharing and intimacy that develops among persons who experience liminality as a group.'" (dictionary.reference 2011) The etymology of the word stems from the Latin *communis*, meaning common or public and is therefore often used to denote a sense of community, public spirit or a willingness to serve one's community. Turner distinguishes between three types of *communitas*; existential or spontaneous *communitas*, the transient personal experience of togetherness. Normative *communitas*, *communitas* organized into a permanent social system and ideological *communitas*, which can be applied to many utopian social models. (Turner 1969: 132)

A participatory digital art project's potential to produce *communitas* can be considered from a number of perspectives in relation to Turner's definitions. Firstly the life cycle of the project through the nature of shared experience and achievement offers an opportunity to develop existential or spontaneous *communitas*, which Turner and Van Gennep argue occurs within a liminal phase / space. The community of the project exists temporarily, although some longstanding relationships maybe established and extend beyond the lifetime of the project. If working well will evolve, "an equality of relations, a comradeship that transcends age, rank, kinship etc. and displays an intense community spirit. Thus people from all social groups may form strong bonds, free from structures that normally separate them." (Madge and O'Connor 2005,93)

If the project is embedded within the practice of place-making then the process of *communitas* becomes one of collective power and production and the shared personal experience of the place-making could be a collective response then integrated into the processes of planning and regeneration. In this sense the inclusion within the system utilises the rules and power relations of the social structure simultaneously, to constrain and enable human agency as being closely involved in the reproduction. This would most closely resemble the post-liminal phase and if we think of communities as being based on

the shared experience of living in a location rather than more romantic notions then normative *communitas* is more easily identifiable. The concept of place-making as a process of becoming through the co-authorship of *communitas*, at once is more achievable if considered as the shift from the potential of the city and its inhabitants to a higher level of actuality.

For Turner (1967) the liminal phase was important as a 'threshold' space that held the potential for *communitas* given the intimacy and commonality of shared experience evolving through the liminal phase of an initiation or rite of passage. The rituals and activities undertaken within the liminal phase provide an experience of where the status quo appears to dissolve. Although initiates re-integrate into society their understanding has shifted. Using Turner's secular re-interpretation of Van Gennep's theories, digital art projects function as liminal phases / liminoid spaces through offering "time out of time" or Turner's concept of "betwixt and between" while being parallel to the everyday existence.

Digital art projects focussed towards the practice and process of place-making provide the time and space to represent more voices and experiences to expand residents' understandings of place and in turn disseminate this knowledge. Pred (1984) states the "character of unknowing in a place constrains the cultural and social projects that eventually may occur" therefore the importance of having new shared understanding of place, or knowing is necessary for the purpose of becoming and any shift from potential to actuality. Through experiencing this process, an intimate shared experience enables the participants of the project to explore different ideas and possibilities and ultimately create different solutions or outcomes for a location.

The 45s series, an on-going series of audio-visual projects, that exist both off and online and offer opportunities for continuous remixing, explore these ideas. Once the physical aspects of the project are complete (motion sensor installations, films, psycho-geographic workshops, projection events etc.) the films and audio mixes live on line with all the samples available for re-mixing. These common lands of digital data enable the contributors to create an on-going co-construction of the area through the virtual galleries and submitted portraits after the initial project is completed. This continues to encourage counter-factual re-presentations and conditions by a multitude of voices. Through the "posing of possibilities beyond what is assumed to be the case," Macleod 2005, the on-going project activities lead to a conscious re-fashioning of their 'place'.

The 'legacy' of the projects, a co-authored *communitas*, reflects and enshrines the community's self-directed, heterogeneous self-image. The 45s series enables the process of place-based learning and re-learning evolving an intimate relationship with place and in turn the location's other residents. Enough compatibility is generated to enable communication and a more expanded experience of place and ultimately learning. Through the intimacy created within the shared experience (*communitas*) of the project and the deconstruction / reconstruction that Turner refers to during liminal phases / liminoid space, a transformative process equitable to individuation "integrating the conscious with the personal and collective unconscious" can occur (Jung, 1962, p. 301).

This process reminiscent of Jung's process of individuation extends the *communitas* of the project through a process that potentially enables diverse groups made up of strangers, to interact with people whose opinions, values and culture are different. The project contains the group giving them enough commonality to begin to feel comfortable with their difference. These emerging relationships can then be capitalised to develop and evolve the places we live, conducive to our well-being with the legacies of the 45s projects include networking activities, campaigning forums and sustainable community activity.

Such persistent challenges to given understandings of place through the constant re-presentation of multiple identities and understandings, ultimately offers, processual re-tellings of the story of that place, the location of individually felt meanings and values expressed coherently as its personality and uniqueness – its individuality. Returning to Jungian psychoanalysis Jung believed that this process of reflection and transformation in which, the essential personality emerges has a profound healing effect. The liminoid spaces that are created through the digital art projects may offer a contemporary opportunity to undertake activities that within a secular existence to experience aspects of the liminal phases of ritual many no longer engage in.

Perhaps in the steps towards co-authoring communities through the use of digital art projects within the process/practice of place-making, the places we reside and ourselves may undergo a process of becoming. In reaching a higher level of actuality, we may go some way towards fulfilling our potential, manifested and tangible in the places we make.

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PLAY WITH FIRE | A REAL-TIME VIDEO EXPERIENCE FOR SUSTAINABILITY

Mónica Mendes, Nuno Correia, Valentina Nisi & Pedro Angelo

Play with Fire is an interactive art installation that proposes participants to ignite generative fires over live streaming video of selected forests. This experience paradoxically encourages playing with fire to stimulate awareness and prevention of fire related damages to the forests. Our goal is to raise awareness for human causes in forest fires and effect attitude change towards environmental protection.

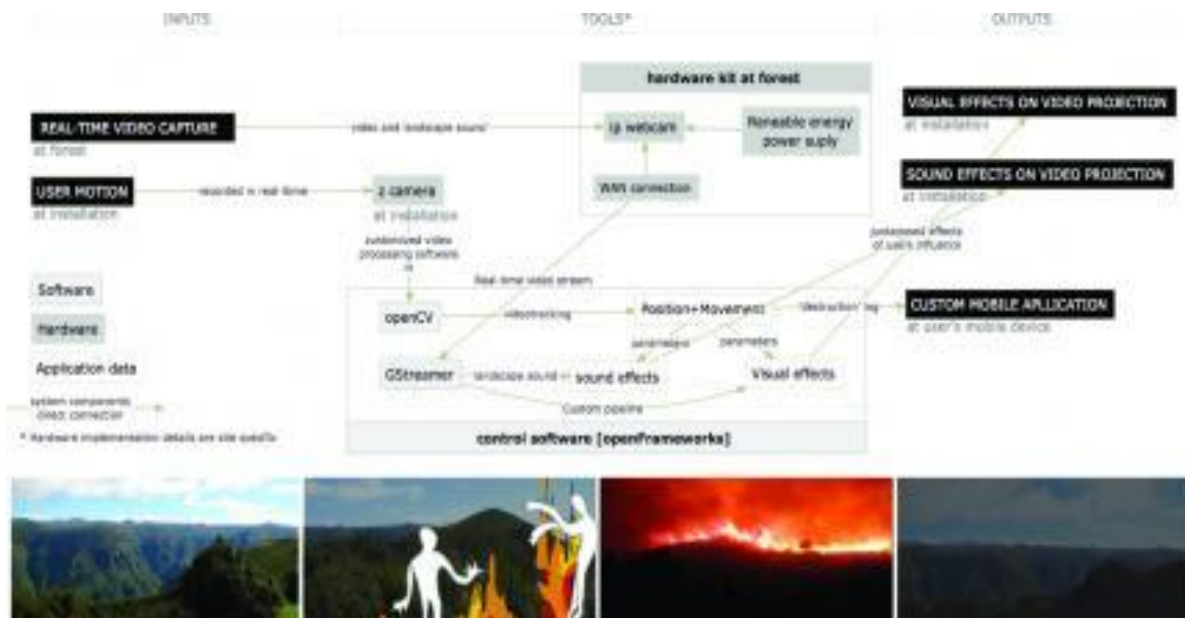


Fig 1. Play with Fire concept art and system architecture.



Fig 2. Sketches for the interactive installation, user experience and gestural interaction outdoors.



Fig 3. Task analysis testing the user experience.

Play with Fire is an exploratory research project that proposes an interactive installation to engage the audience senses in unconventional ways. It is a performative, immersive experience that invites people to interact with real-time video from selected forests by playing with virtual fires through gestural interaction.

We envisage the installation triggering controversial feelings by combining the "beauty and danger" of a forest on fire. This duality becomes part of the experience, and raises concerns in the audience mind, such as the pleasure and excitement of playing with fire versus its effects on a natural resource such as a forest. The experience concludes with visuals of a forest virtual regeneration process underlining the message: the forest will eventually grow again, but what is the price to pay?

In order to foster awareness and stimulate activism, we decided to conceive and design *Play with Fire* as a digital art experience that happens over three different moments: an introduction to the installation and its theme with an invitation to interact with it; the performative active part where the participant engages with the gestural interface, and a reflective part taking the form of a mobile application, which will stay with the participant for a long time after the installation experience.

An ARTiViS experience

Play with Fire is part of ARTiVISS (Arts, Real-Time Video and Interactivity for Sustainability), an exploratory research in digital media related to sustainability [1].

At the intersection of Art, Science and Technology, the research engages a multidisciplinary team that follows a collaborative approach, where artistic practices are supported through technology. Regarding the impact and the potential of art and technology on society and the environment, we aim at creating a “forests showroom” experience through digital media, in order to inspire change in the lifestyle of the public. The outcomes of ARTiViS include an online platform, interactive installations – Hug@ree, Treeel-lucinations, B-Wind!, Enchanted Forest, MAicro, and this *Play with Fire* experience – and the design of a DiY surveillance kit prototype.

MOTIVATION

Living in places that have always been extremely exposed to forest fires, makes us very sensitive to the destruction of the forest patrimony by fire hazards, which also applies to a world scale. This interactive experience paradoxically encourages playing with fire to stimulate awareness and prevention of fire related damages to the forests. Ultimately, we seek to pose a constructive approach to the destructive dynamics of fire that aggravate climate change. Can digital art foster awareness and respect for nature?

RELATED WORK

Play with Fire is a transdisciplinary project and, as such, requires a diversity of references. Involving digital media, the environment, and real-time video, this interactive experience congregates references from the Arts, Sciences, and Technology. The selected case studies presented in this section are examples that in some way inspire the concept, its features and future developments.

Climate change and surveillance are very relevant and currently discussed topics in the areas of digital art and design. The role and potential of design research in the transition towards sustainability is being discussed in mainstream design and digital media art events, such as “Repair” and “Goodbye Privacy” at *Ars Electronica*, *Changing the Change* [2], and *Transmediale* putting the threat to the sustainability of our planet in perspective with “Perish in Beauty? Climate Change as Cultural Demand”. The interactive installation *Play with Fire* also takes us into forest fires issues, specifically: distribution, detection, effects, causes, consequences, prevention, and forests surveillance.

Digital Artists such as Tiffany Holmes, have since a few years engaged in eco-visualizations projects [3] in order to sensitize audiences towards sustainability issues and climate change. Our approach enhances the eco visualization aspect of such an engagement with the activist component triggered by the gestural interface, which reflects the participants actions directly on the real-time video of the forest.

Interactive experiences engaged with the use of technologies are increasingly embodied in video based environments. Whereas real-time video has been mainly used as a functional tool for surveillance, for informational and safety purposes, the use of this resource has an enormous potential for artistic exploration. Some initial steps in this direction have been made by projects such as *Funky Forest*, an interactive ecosystem where children create trees with their body and divert the water to the trees to keep them alive [4]. *Parque* is also an interactive installation with an ecological message: “the growth of a forest is determined by the amount of attention it receives”[5] – the system recognizes vertical movements as inputs for making trees vector graphics grow. Petros Vrellis’ *Fire* installation [6] poetically displays the compositing of generative fire propagation and destruction effects over static backgrounds and Float4’s FireFX demo shows how performative and responsive generative fire effects can become [7]. *Hand from Above* [8] is an experience that playfully challenges our perception of spaces and objects, enabling virtual and real to coexist in real-time, demonstrating participants’ immediate engagement, and it also evidences how determinant scale is.

The *Games for Change* project hosts an archive with many good examples of the expressive power of the medium for environmental awareness [9]. The work of artists like La Molleindustria [10] that appropriate and subvert videogames as an interactive medium for persuasive purposes has also influenced our work.

In *Play with Fire* the participant is confronted with the information of the burnt forest together with the images of it. Regarding visual effects, we can find virtuous examples of fire effects with cellular patterns in Fedkiw’s computational fluid dynamics [11] and Horvath’s high quality artist-directable GPU implementation [12].

Finally, the inspiration towards acting rather than watching comes from compelling and controversial movies such as Stanley Kubrick’s *Clockwork Orange* (1971), and David Fincher’s *Fight Club* (1999). These works stand out as references to recall regarding the construction of experiences that subvert reality and common sense in order to convey a message.

INTERACTIVE INSTALLATION SETUP

In *Play With Fire*, a surveillance camera will be setup at a selected forest location, transmitting real-time video to the installation space, a room inside of which the performative gestural interaction is contained.

One semi transparent wall is where the mash-up media and information about fire hazards and forests will be displayed. From the outside, the participants are seen as silhouettes of the arsonist – “fire wizards” performing inside the installation room forming a choreography with the changing media displayed. This is also functioning as an attractor for the audience to enter the interaction space. When the participant enters inside the installation room, the system asks him or her to place his/her mobile device on a special deck. Ready to face the screen, the audience member is presented with the start of a fire, triggered by positioning the phone over the deck, and he/she can get ready for the performative interaction.

The participant faces the main screen. A whole body gestural interface based on a depth camera captures the participant’s movement. He/she goes straight into the interaction with the real-time video of the selected forest projected on the whole large scale wall. The sound of crackling fire attracts attention

to the action of the fire and how it is spreading. As the user is prompted to act upon the virtual fire, it will react through real-time generative graphics and fire animation according to the gesture just performed. Intuitive and natural gestures for controlling fire (starting it, growing, concentrating, moving it, extinguishing) have been tested and selected in order to map the user engagement, still allowing further performative explorations.

After a certain amount of time, the fire takes over the trees and forest and develops its own behaviors. If at this point the audience does not intervene by performing gestures trying to extinguish the fire, the forest fire climaxes to a point of no return. Fire flames follow the trees structures. Fire has developed its own behavior and spread through the forest. The scene becomes a spectacle for the audience. Once the fire has climaxed, the amount of virtual damage to the forest will depend on how much the audience has played with the fire, how much it has watched the spectacle of burning trees go on and if he/she had ever tried to stop the flames from taking over. A desolating burnt landscape is the resulting scenario.

The interactive experience ends with the participant being presented with a screen showing information of the resulting damage in the style of a game score: as a measure of the damage generated in the Play with Fire interaction along with a snapshot and general data about how the performance fire damages, regeneration times and possible effects on climate change.

The participant picks up the phone from the deck where he/she had placed it when entering the room and is prompted to open a URL that contains a Play with Fire mobile web application that displays the damaged forest the participant leaves behind and its slow regeneration process. The duration of the forest regeneration and the length of time the application will accompany the participant will in fact depend on the data generated during the performance. Participants will carry it as a memento of their experience for a duration determined by the real-time interaction with the installation.

TECHNICAL CHALLENGES

The implementation of this experience as described above brings some important technical challenges, namely the capture of user gestures, the real-time rendering of fire effects, the illusion of destroying a forest over a real-time video stream, and the mobile component of the experience.

Capturing complex user gestures with fidelity and low latency is a challenging prospect. During the project's pre-production we developed a library of gestures to be discovered by the participants that would trigger specific behaviours of the fire simulation. Although these gestures involve full body movement they can be fully described by arm motion. Taking this into account we are using a Kinect 3D depth sensor and mapping user arm movement to *TUIO* input. This allows us to prototype the installation interaction using common multitouch hardware and software tools.

An impressive and responsive real-time fire simulation is crucial for user immersion into the experience and hard to get right. We are using Horvath's high quality artist-directable fire simulation model developed for film special effects [12] and implementing it in real-time.

Virtually destroying a remote forest presented as a real-time video stream presents some interesting technical challenges. First there's the need to extract approximate tree structures from the video to build a "fuel map" where the fire simulation will take place. This is complex to do in a fully automatic

way, so we'll be using a semi-automatic process where the rough tree structures are drawn over the feed in a calibration step and then the optical flow of image features is used to deform these structures over time.

The next challenge is how to composite the effects of fire destruction over the streaming video. We will have to take some artistic license in the rendering of this destruction. We looked into Melek's work on rendering fire damage [13] and start by blending a black matte over the fuel map to simulate the charring of the wood, and then add smoke, ember and spark effects where appropriate to add some visual impact to the result.

One last challenge that presented itself during development was the uploading of a native mobile app to the user's phone. This approach presented problems related to mobile phone security and having to develop and support a different app version for each phone. The solution we found was to make the mobile application a web application, that would only require that the participant's phone have a web browser in order to check his "score" and the regeneration state of his forest.

CONCLUSION

Play with Fire as an artistic experience has been designed, from the beginning, to be ambiguous, even "wicked". Questions raised by the audience in public presentations have focused mainly on its paradoxical nature: "Won't Play with Fire inspire people to be arsonists instead of forest caretakers?" In his book "Persuasive Games", Ian Bogost introduces the concept of *procedural rhetoric* to discuss how games and interactive simulations can be used to teach a point of view and contribute to effect attitude change [14]. By playing with the system's rules, the users become familiar with it and gain a deeper understanding of its mechanics, allowing them to confront their assumptions and beliefs with this new understanding, through a process of cognitive dissonance conducive to changes in personal attitude [15].

We have designed this interactive experience for persuasive purposes, inviting people to engage in forbidden and dangerous actions in a controlled environment, in order to confront them later with the long term consequences of their own choices. In Play with Fire, participants are initially invited to experience a realistic model of something forbidden, usually outside their scope of possibility. They are allowed to experiment with what is wrong as a learning experience in a game-like environment. This (so called) magic circle [16] – where the consequences are negotiable, played in a protected environment – works not as reality abstraction, but as reality protection.

Collaboratively developed by artists, activists and technologists, Play with Fire is an innovative approach - with a challenging technological component - that comprises a strong dimension on social and natural sciences converging New Media Arts and Sustainability. After the conception, design and initial basic prototyping of Play with Fire, the main implementation of the interactive installation is currently underway and is scheduled to premiere in the Fall of 2011.

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BAPSI SIDHWA AND DEEPA MEHTA: AN ARTISTIC COLLABORATION

Claudia Meoli

In this paper I shall focus on the collaboration between two artists who have created two acclaimed artistic results: the novel *Cracking India* by Bapsi Sidhwa, and *Earth*, its cinematic transposition directed by Deepa Mehta. The collaboration between the writer and the director is interesting not only because they share the same topics, interests and poetic expressions, but also because they are both exiled artists.

Introduction

The division of the Indian subcontinent belongs to the memory of every Indian and every Pakistani, as does the violence of the tragic events that started after the Partition was announced at midnight on the 14th of August 1947. That night the world's biggest mass migration began and in nine months, at least two million people had been killed as a result of ethnic violence. Many women were raped and murdered - it is what Sidhwa and Mehta bring back to human memory.

The two artists are exiled, even if they have not been 'forced' to leave their countries, but, once away from their mother land, they have been able to adopt a new and original perspective on the question of the attachment to one's own origin. My contribution would like to determine how their geo-cultural displacement has made it possible, for them, to deal with the issue of the Partition between India and Pakistan.

Cracking India

In an interview with Derek Attridge (1992:55), Jacques Derrida remarks that:

"A writer cannot not be concerned, interested, anxious about the past, that of literature, history, or philosophy, of culture in general. S/he cannot not take account of it in some way and not consider her - or himself a responsible heir [...] Account cannot not be taken, whether one wishes it or not, of the past".

One cannot not write one's own story, and the story of a community of people: Bapsi Sidhwa was born in Punjab, the Indian region where religion, traditions and history have always played an essential part in the memories and experiences of its inhabitants. Needless to say that Punjab was strongly affected by the Partition; the newly established boundary divided the region with such an impact that since then, people have called the division the 'line of hatred'. Sidhwa was born in Karachi and grew up in Lahore - being a Parsi, she remained a spectator of the Partition. When Lahore was given to Pakistan, she was only a child (perhaps her young perception was particularly shocked by what she was witnessing; it must also be the reason why she adopted a child's point of view in narrating the story of *Cracking India*). What is more, at the age of two, she contracted polio, so she was spending her life in solitude: she did not go to school, and could not play with the other children - it was mainly books that provided her with

a space of freedom. She was an 'outsider' and a lonely person, mainly possessing literature as her company, literature creating for her the alternative world to the cruelty she was facing.

Today, Sidhwa does not live in Pakistan; she moved to Houston, in the United States. Since then, she has often come back to Lahore, where she enjoys playing the role of an observer of Pakistan. Her identity is characterized by a kind of 'hybridity', which is reflected in her books, written by a 'Punjabi-Parsi-Pakistani' writer. In this vein, we can also say that Sidhwa's writing is acutely ironic, and, even more importantly, it is always written in very articulate, though accessible, English –she herself having studied through that medium. Of course, her familiarity with English made it easier for the writer to live in the U.S.A. In *An American Brat* (1993,) she narrates her experience: she has faced her exile in a 'double bind' – that is, enjoying American freedom with a point of nostalgia, in a bittersweet way.

Cracking India is Sidhwa's third book. Published in 1991 under the title of *Ice-Candy-Man*, the novel narrates the Partition of India and its consequences from the point of view of a child. In an interview with Julie Rajan, who asks her why she wrote of events that took place in a distant past, she replies:

"I wanted to write about Partition precisely because so little has been written about. [...] When you see something like that, it becomes a very powerful and important memory" (http://www.monsoonmag.com/interviews/i3inter_sidhwa.html).

Cracking India is not, however, an autobiographical novel (even if there are many precise connections): it is the story of the writer's research into one of the most forgotten and hidden events in international postcolonial history. In order to write a novel devoted to the trauma and suffering provoked by such an incredible historical-social fact, she had to find out information – in her research, what she found out was that people did not want to talk about it; everybody refused to remember the kidnappings and ravages that happened to men and, particularly, to women: "Maybe the hurt was too fresh" the writer says. The question of the women's involvement and their suffering was to become the centerpoint of the novel - in another interview (<http://changingupakistan.wordpress.com/2008/08/29/a-novelists-perspective-on-pakistan-a-conversation-with-bapsi-sidhwa/>), Sidhwa observes that,

"at times of such anarchy, women seem to bear the brunt of the attack – they attack a woman because they are attacking a man's honor. A woman is often used and misused for these purposes".

Being a woman herself, the writer focused on the condition of women in that critical period, by exploring the 'collective repressed' and by giving a voice to its female victims.

Of course, there have been other writers who have written about the Partition, such as Saadat Hasan Manto and Khushwant Singh; but they are male writers, who approach their subject matter mainly from their own perspectives. Sidhwa's feminine point of view proves different: the Partition of India created one of the highest numbers of exiled people, mainly women, in the history of the world. These events are narrated in the novel, even if we never find neat descriptions of what is happening. Precision in historical reconstruction, in fact, does not matter to Sidhwa; what is important is to construct a story where women are at the centre.

The novel tells the story of Lenny, a 7-year-old girl, who suffers from polio. Lenny has a nanny, (*Ayah* in Hindi, and the name given to her character throughout the book), who is a beautiful woman surrounded by people who love her. She has two suitors in particular: Ice-Candy-Man and Masseur, both of Muslim

religion. Ayah is at the centre of a group of friends who spend time together, regardless of the differences in their religious beliefs. Lenny, probably because of her walking difficulties, spends more time with Ayah and her friends, than with the children of her age. Ayah is framed in an interreligious and interethnic circle; when the harmony breaks, it is she who becomes the victim of the Hindian-Muslim sectarian war.

Sidhwa uses her character to make her point about the Partition of India, its consequences, and, in particular, its repercussions on women - the events gradually become vivid to the reader, who naturally empathizes with the characters being caught up in the story. It is a story of an 'exile' that begins when people are still in their own homes, when they gradually become exiled in their lands, forced to migrate because of their religious beliefs. We can recall what Julia Kristeva, in *Strangers to ourselves* (1991:8), says,

"In crossing a border (...or two), the foreigner has changed his discomforts into a base of resistance, a citadel of life".

During Partition, borders were first created, and, after the imposition, people had to cross them, leaving their lives behind. The Parsi community played witness to this change - it saw the horror that originated from the transformation, as if it were crossing the border itself - when everything changes, it feels like crossing a border - nothing more, nothing less....

Earth

In his *Reflections on Exile* (1983:185), Edward Said reports some lines of Hugo of St.Victor:

"[...] The man who finds his homeland sweet is still a tender beginner; he to whom every soil is his native one is already strong; but he is perfect to whom the entire world is as a foreign land. The tender soul has fixed his love on one spot in the world; the strong man has extended his love to all places; the perfect one has extinguished his."

The Palestinian scholar further explains,

"that the strong or perfect man achieves independence and detachment by working through attachments, not by rejecting them. Exile is predicated on the existence of, love for, and bond with, one's native place; what is true of all exile is not that home and love of home are lost, but that loss is inherent in the very existence of both."

If this quotation does not sound appropriate for Sidhwa, it seems fitting for Deepa Mehta. A 'hybrid' artist by her own definition, she claims to be a "citizen-filmmaker of the world": not an Indian and not a Canadian either. Actually she was born in Amritsar, in Punjab; as a child, she moved with her family to New Delhi where she graduated in Philosophy. Soon after, she started producing documentaries and she currently lives in Canada. She does, however, travel consistently, from one country to another, continuously trespassing geographical and cultural borders.

In an interview with Richard Phillips (6th August 1999, <http://www.wsws.org/articles/1999/aug1999/meh-a06.shtml>), Mehta says that she has always thought about Partition. She has been fascinated by this event, and also disillusioned by the silence inscribed by Western cinema. When she decided to devote a film to the Partition, her desire was to trespass the fixed images India often recalls to the Western

mind; her aim was to 'de-exoticise' or 'de-orientalize' India - as Said would say. When she came across the novel *Cracking India* by Sidhwa, she thought it was exactly what she was looking for- it was then that the two women artists started collaborating. The chance was there for them because they both felt free due to the distance of time and space. In fact, it was somehow comforting to find someone to share the work with. To make sense of this shared need, and the richness that it created, Julia Kristeva (1991:12) offers her analysis of the advantages of being 'exiled':

"Free of ties with his own people, the foreigner feels 'completely free'. Nevertheless, the consummate name of such a freedom is solitude. [...] No one better than the foreigner knows the passion for solitude. He believes he has chosen it for its enjoyment, or been subjected to it to suffer on account of it, and there he is languishing in a passion for indifference that, although occasionally intoxicating, is irreparably without accomplice. The paradox is that the foreigner wishes to be alone but with partners, and yet none is willing to join him in the torrid space of his uniqueness. [...] Accordance is the foreigner's mirage. More grueling when lacking, it is his only connection – utopic or abortive as it may be."

The collaboration between Sidhwa and Mehta has proved 'utopic': from their intimate and productive accordance, *Earth* was born. According to Sidhwa (http://www.monsoonmag.com/interviews/i3inter_sidhwa.html), Mehta was carried away by the book in such a way that she wrote the script even before signing the contract. That was how Sidhwa wanted it to be: the director had to love her book deeply. At the same time, it was not always easy to collaborate. Sidhwa was always present when the film was being shot; she saw when her title was changed, but, even if at the moment, she did not think it matched the book, she knew Mehta was making her trilogy on the natural elements (*Fire, Earth, Water*). What was really difficult to accept was to see entire sections of the book being deleted: once again, though, Sidhwa understood that cinema is a different media: for instance, it could not contain all the novel's incidents and characters. The most evident and different of the changes relates to the 'end': the novel *Cracking India* follows the aftermaths of the Partition; *Earth* finishes soon after the event, when Ayah is kidnapped. Because of these minute differences, what was becoming clear in their collaboration was that literature and cinema are different; they cannot but rule the experience of reading the novel and of watching the film. For instance, the first part on the screen creates a positive and peaceful atmosphere among the characters in a way that is different from how Sidhwa narrates it in her book; in the second section, everything changes; the tragedy begins; the film changes its register; it becomes darker; it changes its colours... What follows is a short analysis of some of the rich differences between *Cracking India* and *Earth*.

The colours

Colour is an important element in Mehta's films, giving her the possibility to communicate feelings and atmospheres that can be 'felt' by the spectator. It is a powerful possibility and Mehta benefits from it as much as she can, paying attention to the use of colours. Generally, her films have a dominant colour and for this film it was the colour terracotta that came to her mind when she was writing the script. Conversely, she did not want the colour blue. It is exactly like that: the film covers a range of colours from green to yellow, from red to brown; and only in one scene, there appears the bright blue of Ayah's sari.

Michael Taussig, professor of Anthropology at Columbia University, in his "What color is the sacred?" (2006:51), refers to the relationship between Proust and Vermeer, saying that the use of colour in painting is similar to the use of words in writing: "style is to the writer what color is to the painter". Daring a risky comparison, we could say that this dialectics works also for Sidhwa and Mehta: being a director,

Mehta has her own singular ways of expressing sensibility. In her films, photography plays a key role - light is at the core of photography, and one has to know how to use it. Colours change with light, creating various atmospheres and conveying different emotions. These visual elements combine with music - which is always original in Mehta's films. Even though, *Earth* stays faithful to *Cracking India*.

The language

Another difference between *Cracking India* and *Earth* is 'language'. Despite the fact that Sidhwa is Pakistani, the novel is written in English, with a few words in Hindi or Urdu. The official language of India is Hindi; English is common among the upper class and educated Indians. Sidhwa does not draw differences in class, religion, or occupation - every character speaks in English. Of course, this is because of narrative reasons: it would be extremely difficult to read a book with characters often switching language. This limit does not exist in cinema, where a dialogue can be easily understood by adding subtitles. The original language adds realism to the social and cultural picture of the film. English is the *lingua franca* allowing Indians to communicate among the different dialects spoken in India; though it is not the language spoken by everybody. The size of the country and the variety of languages and dialects spoken make it difficult to define India's national language. In this context, English plays an important role - it has lost its negative connotation of being the language of the British oppressor, and it has also developed a unifying function in a fractionated country. If Sidhwa was more or less bound to make a choice, Deepa Mehta decided not to do so. The characters in her film speak different languages: sentences in Urdu, Punjabi, Gujarati and, rarely, in English are pronounced in the film, that switches from one language to another, sometimes mixing Hindi to English: this is a narrative strategy that gives the idea of the 'multilingualism' and 'multiculturalism' of the country.

The British rule

The use of English as *lingua franca* suggests the presence of the century-long British rule, the influence on the politics of the subcontinent and the inheritance it has left. British rule on India is a discussion that is not addressed by the film, while it is clear in the novel, even though neither artist delves deeply into the subject. A scene in the house of Lenny's parents is the occasion to show how this controversial debate can degenerate into a fight. Lenny's parents invite their friends for dinner: Mr. and Mrs. Singh, both Sikh, and Mr. Rogers, an English policeman, with his wife. They are spending an enjoyable night chatting away, when Mr. Singh and Mr. Rogers start arguing; the reason relates to the time when India will be independent, allowing the most crucial points of the debate on British rule to be thrown onto the table. The British imperialistic and racist belief is that the Indians will never be able to self-rule - it is what Mr. Rogers says, strongly opposed by Mr. Singh. They then start discussing what will happen when the British quit India. Mr. Rogers' conjecture is wrong, when he says that the situation is politically confused (the political situation will become clear soon after Partition, with the Congress Party and the Muslim League respectively placed in India and Pakistan); still, he is also right in foreseeing the explosion of violence that will follow. The discussion turns into a fight: as soon as the calm returns to the table, the hosts make a list of the good effects of the British domination in the subcontinent - in the book, conversely, the narration goes on to describe the continuation of a pleasant and relaxed dinner. The point of discussion is presented, the mainstream idea that the British colonialism had, in the end, its advantages: the British built roads, they gave India the regular Post service; they taught the Indians English! Could we expect a better 'comfort' for the death and suffering of so many people involved in the Partition? The novel and the film have played their part in re-opening this question...

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CREATIVE SPACES OF THE IMMIGRANTS: REVISITING THE DISCUSSIONS ON CITY-SPACE, TECHNOLOGY AND ARTISTIC PRACTICES

Ceren Mert

Taking into consideration the matters of diaspora and immigrants, and their 'possible' relationship within the translocal creative and technological flows, this paper will concentrate on the films of one of the most recent notable film-makers: Fatih Akin. This paper will focus on whether Akin's films can form an antagonistic creative space in relation to the hegemonic discourse of the practices of the city-spaces where these immigrants dwell.

To start with, as some authors argue I too endorse the view that globalization always remains an unfinished project. The creation of a 'global culture' should not be perceived as a straightforward homogenization practice. Globalization rather encompasses those processes of systemic desegregation in which the local cultures turn out to be thoroughly interdependent and interconnected. [1] After remarking on globalization and underlining the significance of local cultures within the emergence of the so called global culture(s), one could argue that one area of manifestations of this would be cinema, whereas music would be another. Accordingly, the global cultural flows engender new spatializations around various cultural productions of the diasporic peoples, which have an effect on the global (sub)cultures in return. Just as within the sphere of music, cinema too is a medium that has or rather has the potentiality of altering the everyday practices and viewpoints of people as well as reflecting them.

It is within the discussions of space and the process of globalization that we can merge the issue of city-spaces, how they become the focal points of Deleuze and Guattarian conceptualization of deterritorialization and reterritorialization, as Deleuze and Guattari's geo-philosophy environs territorialization and thus flows. Also, the notion of 'desire' is important in their analyses, as it is an underlying factor of flow and the direction of flow. For Deleuze and Guattari, desire enables beings to be pulled towards each other, which produce connections, and it is these connections that are considered in spatial terms by these two authors. [2]

Articulating the geo-philosophical propositions of Deleuze and Guattari in her work as well, one of the interesting conceptualizations about Doreen Massey, I believe, is her elaboration on space. In this regard, she argues that space is initially the product of interrelations—either emerging from a huge, global level or as tiny as one to one relationships. Second, what Massey proposes is that space encompasses distinct trajectories that coexist simultaneously which thus enable the coexistence of heterogeneities. Third, and which is connected to her other two assumptions, is that space is never finished and closed. [3] Hence, space is always a process that is being made which always entails openness and multiplicity. Recalling the process of globalization in the light of these arguments, where mobility and migrations can be seen as flows and becomings at the heart of the process of globalization, or rather glocalization, how can then the so called "migrant" cinema open up new spatializations, thus pave the way for new becomings, or in other words the 'possibility' itself for new becomings? Spatiality that encompasses such possibilities for new happenings and vibrancy, and just for this reason I would prefer to call it a third space. Also, taking into consideration Lefebvre's elaboration on (social) space as a (social) product, [4] Innis

also contemplates on space in terms of technology and its spatial and social organization of knowledge. Likewise, communication technologies simultaneously produce and demolish difference in their subjects. Innis thus depicts technology being part of a more complex apparatus that both brings out and holds back power. Hence, marginal groups resist as well as they depend on the cultural technologies that create their awareness of themselves as margins. [5] Inferring from Innis's ideas on the relationship between space and technology, it could be questioned if and to what extent technological medium is employed by those at the "margins" of society. That is, in terms of this paper, the aggrieved populations utilizing the technological medium artistically, such as that of shooting and producing films, thus reflecting the hardships of their everyday lives and disseminating their voice more "powerfully".

In this respect, Fatih Akin, who is a second-generation Turkish-German director born in Hamburg, became one of Germany's distinct filmmakers in our contemporary era. Or rather, Fatih Akin is a German filmmaker with a Turkish name and Turkish parents. Akin's dislike of the hyphenated identity label can also be observed from his words in an interview after his film *Short Sharp Shock* which gained a wide success in 1998: "If I can't be Fatih Akin, I'd prefer to be known as the German Martin Scorsese." [6]

Consequently, how Fatih Akin engages the city-spaces in his films will also be another crucial aspect that will be elaborated upon. Furthermore, it will be proposed that Akin creates spaces through his films, which can also be thought of as flows of desire that rather form a third space. This third space is constituted through the characters Fatih Akin employs and the cities Hamburg and Istanbul where his films' protagonists are situated or rather unsettled at –just like Akin himself. Such unsettledness can sometimes be seen by their transition between these two cities, or the idea of going back (to their "idealized homeland"), as well as a disturbance or a feeling of displacement they seem to experience in their current city. In terms of city-spaces and the creation of a possible homeland, taking into consideration the engendering of a third space, I will concentrate on these three films of Fatih Akin: his first full length feature film *Short Sharp Shock* (*Kurz und Schmerzlos*) in 1998, his 2000 movie *In July* (*Im Juli*) and maybe his first worldwide known movie *Head-On* (*Gegen die Wand*) in 2004.

In Fatih Akin's *Short Sharp Shock*, the main characters 'Costa', 'Gabriel' and 'Bobby' who are respectively from Greek, Turkish and Serbian family backgrounds are three close friends with "criminal" personas. The viewer also sees a praying father, a representation that, as Rob Burns indicates, "comes perilously close to the figure of the speechless Turk propagated by 'guestworker literature' and the 'cinema of the affected.'" [7] With the 'cinema of affected' Rob Burns addresses the growth and recognition of the diasporic literature in the 1980s, involving the profound effect of the Turkish-German authors, who also influenced the migrant filmmakers. [8] Accordingly, the Gastarbeiter or guest worker experience was worked up in filmmaking. However, starting from the 1990s there emerged a new generation of filmmakers whose works to quote Rob Burns "is above all notable for the sustained attempt to dismantle rather than recycle cultural stereotypes and to open up a 'third space' between the celebration and the denial of otherness." [9] Although these groups of filmmakers emerging in the 1990s are rather heterogeneous in their filmmaking, they still share a common incentive in their desire to break away from the earlier dominant images that portrayed the migrant Turks as victim. Fatih Akin, who is one of the most successful filmmakers depicting this situation, underlined in one of his interviews that he had started to make his own movies because he was reluctant towards those film productions where migrants could only appear as a "problem". Rather he explains that he sees his growing up in two cultures to be an advantage and enunciates as follows: "I do not have to transmit a message of tolerance or deny one of my cultures. I simply link them –in my person and in my films." [10] These words of Fatih Akin can be observed in his films by the way he reflects a peculiar persona in almost all of his film characters. It is as though the ethnic and socio-cultural features remain secondary compared to the characters he deploy;

as if wanting to highlight the uniqueness of each individuality –where people in the so called “real life” may sometimes be blind to, as a result of their apriori prejudices and categorizations.

I also agree with Burns that Fatih Akin is not resisting to position stereotypes in the name of challenging them. [11] Hence, Akin sometimes by fiercely inserting the viewer to the patriarchal dominance and violence where the female protagonists may at times seem to appear as victims, he also manages somehow to subvert and destroy such representations of dichotomies such as victor/victim, oppressor/oppressed and so on. In my re-reading of Akin’s films, such a subversion of the boundaries of such dichotomies are not just in terms of gender or ethnic backgrounds, but also encompass the inner journey of the main characters; as if Akin is shouting out loudly through them to his viewer saying “feel the pain and fear as well as joy and hope in that moment of human existence.” However, in my point of view, such psychological connotations develop as a result of Akin’s exposure of the viewer to the materialistic reality as well as brutality, nevertheless still interestingly managing to resume the hope for the possibility of the impossible, even when the main characters may hit bottom: for example, the way Akin uses spaces of captivity or claustrophobic spaces such as prisons. Again, as Rob Burns emphasizes, “Akin’s films’ prisons are configured directly and either are shown only at the moment of liberation or function as sites of enlightenment.” As towards the end of his film *In July*, the main character Daniel discovers in prison the reason why Isa has been carrying a dead body in his car’s trunk, which allows for a new bond and sympathy between the two men. Whereas in Akin’s film *Head-On*, the prison becomes the space where Sibel visiting Cahit there for the first time confesses that she loves him which in turn changes Cahit’s stance towards life. Accompanying such a transformation in his inner life, when he gets out of jail he has rather a different style and appearance: the reckless and dirty rocker Cahit is gone and a more charismatic and stylish Cahit has come. Hence, the boundaries between the brutal reality and spiritual imaginary all get blurred.

In Akin’s 2004 film *Head-On*, one can remark on his presentation of spatial and temporal transition between Hamburg and Istanbul. [12] Further, Akin utilizes the issue of self-destruction through the male protagonist Cahit who has distanced himself from his Turkish background, therefore cannot speak Turkish well, and who has a suicidal background and loves punk and rock music as well as cocaine. His apartment in Hamburg is as dirty and messy as a pig’s hole. One night in his car, he attempts to commit suicide by stepping on the accelerator and crashes into the wall, later opening up his eyes in a hospital. Just shortly after this incident he meets Sibel, the female protagonist of the film while waiting for his doctor at the rehab center to call him. Just after getting out of the doctors room, Akin sort of surprises his viewers through his character Sibel, who has also tried to kill herself and therefore is too staying in the same rehab center, runs towards Cahit, whom she has never met before, says “you’re Turkish aren’t you? Please marry me.” Cahit in his cool manner rebuffs her in slang and goes away hurriedly. The viewer gets to realize Sibel’s insistence in marriage is only because she wants get free from her family and marrying a Turkish man is her only escape.

Now, going back to the spatial transitions in Fatih Akin’s films, and in this case of *Head-On*, as mentioned earlier, there are two cities: Hamburg and Istanbul. Cahit, after getting out of jail goes to Istanbul to find Sibel, where one immediately becomes aware of the sea, the Bosphorus Bridge and the cosmopolitan city with busy and colorful sideboards at the Beyoğlu area in Istanbul. As in almost all of his films, Akin playfully utilizes space, under various categories in my point of view. In this respect, music is maybe one of the most crucial creators of space in his films. Akin applies music and sounds so eclectically, from punk-rock music, to jazz and soul, to hip-hop, to electronic, to traditional as well as alternative Turkish music and many more. Hence, the ‘lived spaces’ of the characters and the spatial transitions are accompanied by the director’s sophisticated taste for variety of musical genres. For instance, in *Head-On*, the

film opens up with an orchestra of a gypsy band in front of Istanbul's Bosphorus Bridge where a woman sings a traditional love song 'Saniye'm'. This should be seen as the chorus of the movie as it appears a few more times throughout the film. However, as said previously, while Cahit is in the car trying his failed suicide attempt, he listens to Depeche Mode's song 'I feel You'. In various scenes one can hear the song of Nick Cave to the West Berliner experimental group Einstürzende Neubauten.

Another suggestion to why Fatih Akin can be thought of as yielding a third space can be analyzed in terms of Lefebvre's 'representational spaces'. Lived spaces are those spaces that embody the real and the imagined spaces simultaneously. Or to put it in Lefebvre's words, "representational space is alive: it speaks... It embraces the loci of passion, of action and of lived situations, and thus immediately implies time... It may be directional, situational or relational, because it is essentially qualitative, fluid and dynamic." [13] Within Lefebvrian trialectics, the third space, that is, the representational spaces also embody the first and second spaces, which are the perceived and the conceived. Likewise, Fatih Akin's films can be seen as this gateway to the third space because of its expressiveness of the diasporic community. Such an expressiveness is not only seen in the case regarding the Turkish diaspora, but also the Italian, just in the case of his 2002 film *Solino* or the Greek in the case of his 2009 movie *Soul Kitchen* and so on.

In terms of Akin's expressiveness of the lived spaces of both those in Hamburg and in Istanbul, I prefer to call it a possible representation. One of the reasons for this is my own problem with the issue of 'representation' as when one declares that s(he) represents something or a group of people it would never be a one to one replica of what is being represented. Second, representation could itself entail a hegemony resulting from relations of power. Also, as there is a constant flow and dynamism within the spatial praxis, there will remain possible gaps as well as a possibility of change. Nevertheless, with its 'possible representations', successful cultural productions such as the films of Fatih Akin, I believe, have the power of altering boundaries of a globalizing, glocalizing or translocalizing world and its everydayness. Hence, recalling Deleuze and Guattari, by such an expressiveness through his films Akin de-territorializes the boundaries of the social space and its cultural flows and desire, in order to incorporate his own desires and thus re-territorializes them.

Akin's characters are not trapped within a victimized space, but they interact within the everyday life with others of various backgrounds. Respectively, Akin's films indicate a move from the cinema of the victimized, or the affected, or the subaltern to a cinema of hybridity. Although, the viewer is presented with characters that are attributed local aspects of various ethnic backgrounds, they interact and engender alliances or disaffiliations with each other within a transnational spatiality and temporality. For instance, one of the main underlying preoccupations of the director in his film *In July* seems to be the idea of "boarders". I view this film as standing for Akin's own transnational imaging of the world and his preoccupation with questions such as passports, borders and the reasons of restrictions for crossing territories. As in most of his films, Fatih Akin reflects the utopia where he crosses borders in order to achieve a better place that is symbolized with the city of Istanbul. Correspondingly, the male protagonist Daniel who is a shy schoolteacher with a routine life in Hamburg, one day buys a ring with a Mayan sun symbol from a street vendor called Juli (July). Juli tells Daniel that he will find his true love by the guide of this ring and that he will recognize that person, as she will too have the same Mayan symbol of the sun. However, Juli, who herself fancies Daniel believes that in the end he will understand this person is Juli herself. Later on, Daniel falls in love with a mysterious Turkish woman named Melek ('Angel' in Turkish), from Berlin, who comes to his town wearing a t-shirt with a sun pattern on, leaves for Istanbul for vacation a day after. Daniel being so charmed by Melek believes she is the one hence decides to catch up with her in Istanbul. It is after this incident that the road trip begins in Hamburg, passes through Bavaria, Hungary, Romania, Bulgaria and then it finally ends in Istanbul. In the beginning of his road trip while in

the car, Daniel coincidentally sees Juli who is hitchhiking. The paths of Juli and Daniel will intersect from time to time where in the end of the film, Daniel will realize that his so called “sun” that he was searching for and going after was not Melek but Juli herself.

Deleuze and Guattari’s concepts of smooth space, deterritorialization and nomad can be very well applied to *In July*, as well as to his other films. However, in this case of *In July*, the deterritorialization takes place as part of the road trip of Daniel and Juli where Akin seems to be teasing with the ideas of physical borders and the official documents needed to prove that one belongs to a specific place. This film, according to me, is most probably one of the director’s best manifestations of his emphasized transnationalism and hence his so-called nomadic characteristic that is expressed through his creation of smooth spaces. The smooth space, for Deleuze and Guattari, is the space of the intensive becomings and the nomad, whereas the striated space is the product of stratification, especially that is caused by the State apparatus. [14]

I believe as being part of the second-generation youth with a Turkish descent, Fatih Akin would not be the migrant like his parents, but a nomad in Deleuze and Guattarian terms. As he moves while he is seated, just like the nomad; he is from Hamburg. What he is right now, that is, his worldview was formed through his experiences in that city, hence Akin’s hometown. However, the director himself moves globally as part of what he produces cinematically. In this respect, it would not be wrong to argue that he creates smooth spaces through his expressiveness; in other words through his cultural productions of films, where one could witness his criticisms as well as his hope for a better world. One of the manifestations of this would be the multilingualism in his films: Turkish, German, Greek etc would appear in different parts of his film as well as the variety of sounds and music he employs as mentioned before. Rather than the nations, we see that it is the cities that have a profound emphasis in the films of such second and third generation of filmmakers, which would not be a surprise when taking into consideration the emergence of a new global cultural economy built around city or urban spaces. To recall Lefebvre once again, space is socially produced. For this reason, it could be thought that humans create the spaces where they live and therefore it could be remarked that space embodies the ‘political’ as it involves the appropriation and distribution of resources within the everyday life. However, the openness and the multiplicity attributes of space, as Massey have underlined, also engenders the possibilities and changes yet to take place. In this respect, it could be thought that Fatih Akin is one of those artists who reshape the dynamics of spatial formations through his questioning and expression of the everyday lived spaces of the ‘displaced’ peoples and their so called “differences” for a cultural reconsideration of spatial politics.

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HYPERIMAGE RELOADED. THE EXPANSION OF THE PHOTOGRAPHIC IMAGE IN VIRTUAL SPACES

Karin Mihatsch, Roswitha Schuller & Markus Hanakam

“HYPERIMAGE reloaded. The expansion of the photographic image in virtual spaces” is based on the on-going interdisciplinary collaboration between the artistic practice (Hanakam & Schuller; artists, Vienna/Austria) and the art/cultural sciences (Karin Mihatsch; researcher, Paris/France).



Fig. 1. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller, web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller.



Fig. 2. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller, web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller

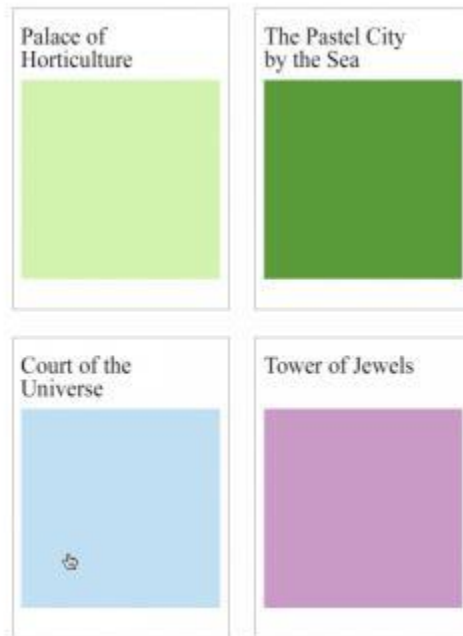


Fig. 3. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller, web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller

This paper is based on the ongoing interdisciplinary collaboration between artistic practice and the art/cultural sciences. It is intended to broaden and deepen some of the issues raised during the inter-working of the online-work “Palaces & Courts” (1) by Hanakam & Schuller. The work – based on the imagery of photography – was created within the ongoing discourse with the researcher Mihatsch. (2)

From his concept of the World Wide Web, Tim Berners Lee paved the way for a wide distribution of images on the Internet. These images follow other regulations than printed images and are committed to the process: links between images may be set by respecting a network or structure called “Hyperimage”. According to this structure, any image can be integrated in any network or sequence. These sequences may be narrative or not, transparent or not.

The Matrix behind “Palaces & Courts” (“P&C”).

“P&C” is a Flash based computer application for online use basically working on various Pools of Text/Image information in connection with random generators. These so called “Pools”, which are extracted text fragments from the exhibition catalogue “Palaces & Courts of the Exhibition” by author Juliet James, attempt to give an overview of the Panama Pacific Exposition San Francisco from 1915, in

terms of describing the exhibition areal, its palaces, courts and intersections as well as the exhibit, showcased in this temporary World Fair architecture. The catalogue text can now be found online as a digitalised version at Project Gutenberg.

The artwork “P&C” works in two dimensions; reconstructing the architectural setting in an abstracted and interactive mode as well as distilling the atmosphere of a World Fair of a time, that nowadays appears to be nostalgic. The basic graphic pattern consists of uni-coloured fields in combination with short texts; these may appear in a group of four, or as single units or as just “detail”, which takes the single colour tone only. In a group of four, every colour field has the same quotient of grey, so there is always the impression of a harmonious colour play.

The Matrix of “P&C” is simple in its programming, but confusing to the user, as it does not follow a tree-like structure, as one could expect on the first clicks. There are four instances -which form pools- the random generator can revert to: Architecture (A), Exhibit (E), Exhibit Detail (ED) and Colour (C).

Pool A is composed of architectural terms of the world fair; for example “Palace of Varied Industries” or: “Court of the Ages”. Pool E refers to single exhibits inside these Palaces or the various Courts. Both A and E pages always show a group of four. ED is a direct link from one element of E. Finally C shows details from EDs.

The starting page always shows the user A, which can link to the pools A again and E; this action continues randomly.

Once the user gets onto the instance E, then E or ED is linked in; this action also continues randomly. Once the user gets onto the instance ED, there is only the option of linking onto C, and in this case it does not link to the whole pool of Cs, but only onto the colour that is connected to the colour from the previous exhibit detail page. Once the user gets onto the instance C, this may randomly link back to the previous ED; or to pool A, or to pool E, or to pool C.

Behind this Matrix, that is not over-complex, lays the artists attempt to mirror strategies of pictorial production as well as the motional and atmospheric embedding of this production within Web2.0. This paper is also intended as an interplay between a theoretical discourse about re-production of (photographic) images, the structuring of images and a media-artistic approach towards this issue.

Creating the Hyperimage.

The development of the Internet dates from the 1960s and was a coproduction between scientists (content) and the US military (budget). (Warnke, 17f) At the beginning economic reasons were not the focus, but rather the exchange of information in a scientific context. The first networks were developed in the USA (Paul Baran: ARPANET with following applications from the early 1970s: TELNET, FTP and E-MAIL) (Warnke, 34ff) as well as in Europe (Donald Davis: MARK I, opened in 1969). (Warnke, 20ff)

Beside these there were several other networks. To enable communication (links) between the different nets, the Transmission Control Protocol (TCP, presented in 1973) was introduced. TCP and the Internet Protocol (IP) permitted the connection between different networks. (Warnke, 43)

In the late 1970s/early 1980s the first PCs, Apples and Macintoshes came on the market. For this reason and due to the dissociation of the Internet and the Military, the user-community enlarged remarkably despite geographical limits. From 1989 to 1992 the WWW was developed at CERN at the suggestion of Berners Lee. (Warnke, 46ff) There, different research teams worked on „non-sequential writing". The so called "Hypertextsystem" offers a references-net: Consequently, researchers can work simultaneously but in an independent way on the same document. (Warnke, 50ff) This innovation lays the foundation for the distribution of images on the Internet. The processual images on the net can be integrated in the Hyperimage-Structure that allows a non-sequential link-network and creates a sort of narrative structure between images.

Besides the structure of Hypertext and Hyperlinking; what is especially intended by using the term "Hyperimage" is not only its quality in web-based structure based on its programmatic level, but its very distinct quality of unfolding narration, plus an atmospheric "sense" of the topic it is related to, which can be allegorised by the term "cloud". Continuing with the example of the world fair catalogue – how can a physical representation of the world be transferred into the virtual? And in the sense of this transforming process, taking a world fair catalogue and reconstructing it as an online computer application is so much an allegory for the internet itself. It is about putting a physical setting into an imaginary setting; digitalisation and virtual re-construction then have narrative quality, in the sense that the virtual space unfolds an imaginary space as we know it from literature or gaming. This shift from "analogue" imaginary to "digital" imaginary spaces – the difference cannot be made by the term virtual itself - may be caused by a crisis of physical space, a process that Paul Virilio describes as "the aesthetics of disappearance". (Virilio, Schroer 263)

From exhibition structures and guiding systems to image structuring in networks.

Paul Baran defined three different communication-net-systems: the star (centralised), the tree (decentralised) and the interconnected net (distributed). All three net-structures do not correspond to the Internet. The Internet is rather provided with a lot of nodes linked with little links and little nodes linked with a lot of links. This is typical for a scale-free network. The research-group around Albert-László Barabási tried to display the "continents" of the WWW. This attempt showed the wish to reproduce visually a given situation. (Warnke, 106ff) The desire to visualise the world became apparent in the universal exhibition a long time ago. For example, the "Panama-Pacific Exposition of San Francisco" presented a representation through the latest inventions and fabrications. By the decontextualisation of the traditional frame and this new structuring of the exhibit objects, another perception is evoked amongst the beholders. (McLuhan). So, our world is translated into another structure by original objects and representations.

The representation-process is submitted to another translation by the catalogue. (3) On the occasion of the "Panama-Pacific Exposition" the catalogue „Sculpture of the Exposition Palaces and Courts" was published. It contains texts and BW images and documents on the architecture and sculpture of the exhibition. So we can say, that in a linguistic and visual way, the catalogue focuses on the structure providing elements, like the pavilions (= nodes), independently from the exhibited content. (The IP also doesn't care about the content.) So the succession of the chapters proposed by author Juliet James could be considered as the representation of a way (=links) through the real exhibition/network of pavilions.

The catalogue is organised in a tree-like-structure. It is introduced by a general foreword, which aims to give a certain orientation to the reader. The reader then has the option to follow the sequence proposed by the author, or to follow their own personal order.

There are different online versions of this printed catalogue. Here we will have a look at the OPEN Library version.(4)

The formal characteristics such as pages and chapters, have been maintained in the (animated) scans of the catalogue.

The typical internet structure is not visible for the user at first glance, but influences the handling and the reception (Genette): instead of thumbing through the catalogue, the user clicks on the pages, the haptic sensation with the object "book" gives way to visual interaction with the screen. Finally, the dimensions of the pages have been adapted to the screen format. (Malraux) Another difference between the printed and the online version is the choice of having the catalogue read to the user. This processual characteristic is an element that cannot be translated into another media.

The structure of the real exhibition is very well presented in the online version: the internet technique permits the showing of several small pictures of the catalogue pages at the same time. This application renders possible a new point of view of the exhibition structure.

As users we grew up with the "traditional" internet of the 1990s, that was organised mostly in tree-like structures, a setting that represented reality in a form with reduced complexity without limiting the possibility of listing content. With the rise of so called Web2.0 applications, our orientation through the internet has changed. The term of "surfing" may still be appropriate to the single user, although this new 'wave' carries along with it, much more individual information than ever before. Users show a tendency to develop a second "reality" inside the "virtual reality" (an example is "Second Life"), so there is a huge contingent of highly individual data transported via the internet. To come back to the media art context of this paper, the example of "P&C" shows an attempt to make this process of stumbling through pictures and stories, without finding the way back or knowing how one got there, visible.

Narrative aspects, associations and the role of the beholder in hierarchical and net-like structures.

The narrative is accented by the dramaturgy developed by Hanakam & Schuller. "Dramaturgy" is described - in the German Duden - as the "teaching of the outside structural form and the regularities of the inner structure of the drama [...]" This definition evokes the presentation structure which is put on centre stage: the frame will be visible.

The issue of the narrative within the internet is spreading in various directions, as it deals with hierarchies, power, communication, psychological aspects and many more themes. With "P&C" the focus is set on the main aspects of reproducing physical space and developing a kind of stage-like setting; principles known from literature as well as from gaming. Indeed, the matrix of "P&C", and the immersive aspect on the user, is quite similar to Role Game Playing, a play-structure at the intersection between story-telling and gaming, that is also strongly connected to improvisational theatre, but without a clearly defined audience.

Three-dimensional elements disappear in photographic (digital) reproduction. The picture is reduced to two dimensions. Hanakam & Schuller break up this two-dimensionality thanks to the narrative moment: the beholder takes an active position (Push and Pull Media) and follows a way/parcours through the structure. The beholder/user moves through the space of the universal exhibition using imagination on the one hand, and on the other hand by paging through the catalogue "Sculpture of the Exposition Palaces and Courts". This all doesn't happen in a linear way, but follows the non-sequential linking system.

"P&C" makes the transformation of the physical world into the imaginary playground visible, as it unfolds this transformation process visually, in re-assembling text passages and by offering a colour-based guiding system that gives the most possible latitude for association.

Photography in the light of the transformation of its materiality in depictions of exhibitions, printed and online exhibition catalogues.

There are no longer any images in the computer system, only binary codes, which can represent either image, text or sound. So the image itself disappears by being translated into another coding-system. It only evokes the impression of still being a picture. Image and text are now at the same code-level; only the user makes a perceptual difference.

The uni-coloured picture on the screen still has the same density of data information, as the "concrete" picture would have; though the information to its beholder is at first sight less complex – in consequence the "abstract" picture will be assumed as complex to, depending on the effort the reader has to put into its interpretation (McLuhan).

In contrast to analog photography, which serves as a memory tool, digital photography devotes itself to visual communication, according to Andreas Schelske. (5) This means that the digital image communicates in an active way, whereas the analog picture rather memorises in a passive way (Push and Pull media). So, we can speak about an interactive situation between digital data and the beholder.

Setting up a digital representation of a genuine physical figure always results in a third, different figure, not only within the internet, but in digital media in general ("The virtual reality"). So this „third“ should not be analysed in reference to its representative quality, but also by its transformatory effects – that impact on structure, narration and aesthetics.

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AUGMENT_ME: AN ALGORITHMIC MEMORY, ABSENCE AND PRESENCE IN THE CLOUD

Brad Miller

Can you have a memory without photographing it? Where does a memory live? How do we make sense of them? If it's online, who owns it? What is association at a global scale? What are the conventions of western time and how might that be visualised or utilised? Can you live forever in the cloud? This paper examines these questions through the media art installation *augment_me*.



augment_me, 2009, Brad Miller, Installation, Artspace Sydney. Image Copyright Brad Miller.

The ultimate promise is that the flow of data may restore the flow of life when it is temporarily halted. Biological death becomes a small death, data becomes the through line that joins old subject to new. [1]

Data and Identity

The autobiographical starting point to *augment_me* was an ontological crisis not dissimilar to the one experienced by the protagonist in the Italo Calvino story *The Adventure of a Photographer* [2] that Lizzie Muller cites in her article [3] about my interactive media installation *augment_me*. When what was to become *augment_me* began, I was an amateur photographer resembling a life logger who lackadaisically aimed to record every moment of his life.

In 2000, prior to the existence of Facebook® and Flickr®, I bought a low-resolution digital camera on a trip to China. The speed, ease and in-expensive production costs the camera afforded me meant that I was soon obsessively snapping everything: the daily state of my bed, an empty car park, signage, friends at a wake, a flower, architectural detail, a sleeping girlfriend. Eight years later, I bought a digital SLR camera with better lenses and more capability. The photographs changed. There were panoramic landscapes, a closer attention to skies, a greater awareness about light, angle, resolution and focus – they sat alongside the ‘snaps’ with no superior value ascribed. My only interest was the actual moment and recording it. Those 12,000 or more photographic moments, taken over 11 years, became the images comprising the *augment_me* database: my through line that connects past and present, the banal and significant, public and private, life and art.

Also germane to my obsessive recording and the subsequent creation of a database was a loss of artistic identity, in part a result of the fact that the technologies (for example, the CD ROM including the Mac “Classic Operating system” and analogue video) that I had worked with early in my artistic practice had become redundant and were superseded by other technologies. Consequently, my work [4] and the evidence of its existence disappeared. The loss was traumatic. *augment_me* was born, I came to understand, only retrospectively, from an anxiety about not disappearing as a creator.

In early 2008, I mocked up the first version of *augment_me* on a computer with multiple screens; in November 2009, the first public version was exhibited at Artspace in Sydney, Australia as a large scale installation, using continuous, long format projection, a responsive granular synthesis soundscape[5] using multi-channel audio and video tracking (the interface between the media and the audience is through this tracking system).

Mediated Memories

Films or photos are not “memory”; they are mediated building blocks that we mold in the process of remembering. [6]

Definitions of memory and experience are inextricably linked up with notions of place and time, notions that obviously affect our memories. As memories are increasingly mediated and thus constructed by networked technologies, the boundaries between present and past are no longer a given. [7]

A memory can be of a moment, an event, a feeling, a person, or object – existing in the past, remembered but not always reliably. Memories can be repressed, re-configured, forgotten and re-found. If, like the photographer of the Calvino story, I set out to photograph every minute of every day, I would fail to capture my internal life and the internal lives of others. How to photograph aversion? Contradiction? A lie? Can I have a memory without photographing it? Yes, of course.

My focus on memory, is not memory as the subject of philosophy, cognitive psychology or neuroscience but is specifically, about the interplay between memory and technology transforming how we create identity and memories – and possibly miss, in that process, the elusiveness of identity and memory.

I have described *augment_me*, in the past, as a memory machine of sorts. It tracks my relationships with people, things, places and scenarios via the use of streaming photographs and an algorithm, devised by

me and a software programmer, [8] which is used to structure the flow of thousands of photographs unfurling in horizontal film-like strips, sometimes in different directions, triggered by the movement of a viewer, under sensors, in the exhibition space.

The horizontal, moving film-like strips, other than the nostalgic allusion to super 8 or 35mm, were devised originally because I wanted to make use of western conventions of time used in Mathematics and Science: negative space or time (past) is to the left and positive space (future) is to the right; at the center is the origin (stasis). And so, with *augment_me* the viewer can change the film strips' velocity and direction, by moving their position relative to the center line of the installation. With a movement, the viewer can make the strips appear, at least conceptually, to move back in time or forward to the future.

Walking into the dark space of the gallery, the viewer was not always aware that their movements in the room were triggering the shift in speed and change in the direction of the horizontal strips. What I had not predicted was the oft-repeated impulse of the viewer to move closer to the individual photograph, the want to take a closer look, to stop the flow of data so they could connect with an image.

This presented an opportunity to re-think not only the interactive element of *augment_me* but also how I thought about memory. To take a photograph or be in possession of one, to feel that you have somehow entrapped the experience by making it still in time is a denial of the slippery nature of time.

When I began, I didn't question the "truth" of the photos, they were a record of my experiences, places and people, light and darkness. As the database grew and I was able to manipulate and alter the flow and order of the images, I was able to re-make the memories, alter the context of each individual photograph within the greater whole and to each other. My relationship to the images became more plastic, less resolute and so did the "truth" of them. I relaxed. Perhaps because I no longer feared the memory disappearing, stored as it is in cyberspace, in the cloud.

I came to see the photos less as mementos significant only to me and more as fragments caught in a digital stasis which when re-arranged could throw up new meanings and associations – not only for me but for others and how they think about their own mediation of memories.

augment_me, as a form of algorithmic memory provides an opportunity to experiment with the record of past observations and images evoking memories; I re-make them and their relationship with one another, I disprove, for me, their fixed place in the hierarchy of my memory.

The modularity and flexibility of media creates the possibility of an algorithmic memory: an increasingly intelligent self-organising extensible memory which can circulate independently of human intervention. [9]

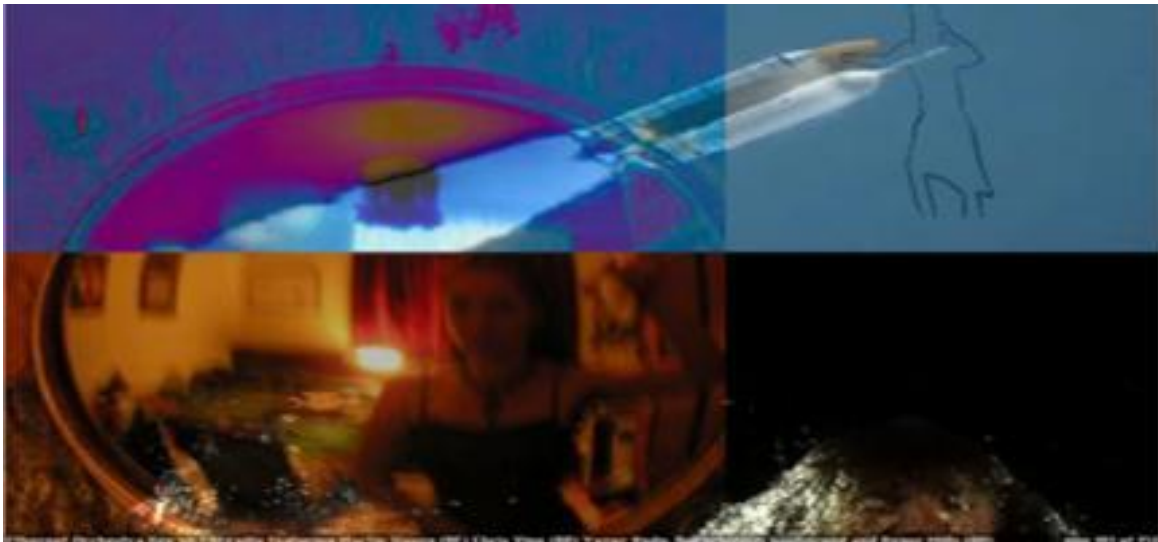
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ETHERNET ORCHESTRA: INTERDISCIPLINARY CROSS-CULTURAL INTERACTION IN NETWORKED IMPROVISATORY PERFORMANCE

Roger Mills

The study of interdisciplinary cross-cultural interaction in networked audiovisual performance serves as the starting point for Ethernet Orchestra's 2010 telematic music improvisation and live cinema performance, *Distant Presences*. This paper outlines and technical facilitation of the performance, evaluation methodologies and the creative strategies employed by the dispersed musicians and visual artists to collaborate remotely.



Screenshot of networked live cinema mixing by Neil Jenkins, Graziano Milano and Helen Varley Jamieson in VisitorsStudio interface. Used with permission of the artists.

Introduction

Technical and creative strategies involved in collocated audiovisual performance have to be reconsidered when performers are separated by large geographic, cultural and “acoustical distances.” [1] While a burgeoning knowledge of eclectic network performance has illuminated many of the inherent technical issues involved with dispersed interaction, there remains poignant issues of intercultural perception and cognition in interdisciplinary, networked collaboration. This paper seeks to address these concerns by examining the strategies that the remote musicians and visual artists utilized in realizing this improvisatory, telematic audiovisual performance. Considering differences in perception across the dispersed collective, it adopts a semiotic perspective focusing on the role of metaphor in understanding signs in improvisatory musical and visual interaction. Viewed through the framework of distributed cognition, the interface and use of video is examined as features of a “conceptual field” [2] for evaluating collabor-

ration across artistic disciplines and cultures. The collaboration combined intercultural musical improvisation and online image mixing spanning four continents and time zones. Networked musicians were located at the University of Technology, Sydney (AU), Kunstmühle gallery, (DE), and Londrina (BR) with visual artists in Sydney, London and Munich. The performance was broadcast by FBi Radio, Sydney, and streamed on the Internet as “Radio You Can Watch”, allowing listeners to view the accompanying live visual mixing to the radio broadcast. This form of cross-cultural, interdisciplinary collaboration affords unique opportunities to investigate the technological and creative strategies involved in producing a live, networked audiovisual performance for radio, which as far as it is known, unique for the medium.

Ethernet Orchestra is an international network music ensemble comprised of skilled musicians from a diverse range of cultures and improvisatory traditions. The instrumental make up of the group includes, Turkish oud & bendir, Mongolian horse fiddle, throat singing as well as guitar, trumpet (played the author) and Max/MSP electronic processing. The collaborating visual artists are also known for their work in a range of audiovisual practices, however in this performance they would be best described as live cinema artists rather than VJ's. The term VJ initially described video jockeys presenting videos on MTV (Music Television), but as Makela (2008) argues “metamorphosed to include video performance artists who create live visuals for all kinds of music.” [3] However, the term also carries associations with club culture in which the VJ's contribution is to mix visual projections to accompany a DJ's music set. While these distinctions are somewhat diffuse, live cinema or real-time audiovisual performance is seen as routed in narrative art practices, with a history dating back to lantern shows and shadow plays. Network artist, theorist and participant in this performance Helen Varley Jamieson notes how problematic these terminologies can be, but adds that a more succinct term CJ (Cyber Jockey) has emerged recently to describe Internet based audiovisual performance.

Networked Audiovisual Connectivity

Connecting musicians and visual artists across four time zones with low latency and high audiovisual fidelity required a combination of network interfaces capable of synchronizing dispersed collaboration without interruption. While documented networked audiovisual performances have employed bespoke interfaces on high-speed research networks, Internet2, KAREN, CERNET2, the multifarious configuration of regional networks, participant addresses and the machines being used in this performance required accessibility rather than speciality. This was particularly necessary for the performers participating from remote locations with domestic connection speeds. Player communication between the audiovisual interfaces was also paramount for synchronization and the demands of a live a radio broadcasting schedule. This was achieved by a combination of IRC (Internet Relay Chat) and interface text windows coordinated at the central hub studio at the University of Technology, Sydney. Although a radio broadcast was the principal performance medium, the station studios were not technically equipped to facilitate the performance. It was therefore decided that the University of Technology, Sydney would best provide the technical hardware, sound requirements and network to run two bandwidth hungry interfaces needing fast up and download speeds.

While a number of network audio interfaces could have been employed, it was decided to use the ‘plug-n-play’ platform eJamming, a proprietary multi-user interface, using peer-to-peer architecture that transmits 44.1 kHz 16 bit (CD quality) WAV files. The interface sends packets (signal as digital information including its destination) via UDP (User Datagram Protocol), making it a fast, high fidelity platform for synchronous connectivity. Its low level latency is achieved through compression algorithms that

shrink the file size for high packet flow, and its peer-to-peer configuration allow it to route the signal directly to players rather than via external servers. This transforms large network latencies of up to 150ms down to approximately 11ms (imperceptible) in the interface, effectively creating collocated acoustics for the networked players. Player soundcards are connected via USB, and audio in-and-out parameters control monitoring levels. A text window provides communication between musicians facilitating synchronous dialogue between performers.

The “live cinema” mixing was performed in the multi-user audiovisual interface VisitorsStudio, a Flash based environment, enabling artists to “upload sound files and still/moving images (jpg, png, mp3, flv, swf) to a shared database, mixing and responding to each other's compositions in real-time.” [4] Performers upload images, short animations or movie clips, which are then selected and looped in a mix window. Images and clips can be synchronously manipulated, changing parameters such as size, perspective, contrast and filters. Artists improvise with collages of static and moving images responding to each other and the audio stream in real-time. Figure 1 shows a screenshot of the networked live cinema mixing in the VisitorsStudio interface.

As the hub studio was located some miles away from the radio station, the networked performance was streamed from eJamming to the station studio via the Internet broadcasting platform Nicecast. Nicecast is a client-server platform that broadcasts audio as a compressed Internet stream to other machines via a URL (Universal Resource Locator) or web address. This allowed the station to then re-broadcast the stream on their terrestrial frequency 94.5 fm, along side the stations own Internet stream. Both local and international listeners were then able to watch the live cinema mixing via the url <http://www.visitorsstudio.org>. For artistic and evaluation purposes the visual mix was recorded and archived through the interfaces sequenced file playback system, and sound and video of the musician's performances was also recorded. The complete audiovisual performance can be viewed at <http://www.eartrumpet.org/distantpresences>. Despite the array of dedicated network interfaces, the humble telephone served the purpose of tele-communication device between the station studio and the university in a pre-performance interview with the author.

Collaborative Networked Performance

As an area of research, collaborative, networked performance has become a point of considerable interest in recent years. As far back as the 1970s LAN (local area network) computer music experiments of the League of Automatic Composers to contemporary WAN (wide area network) performances of the Stanford SoundWire group, Pauline Oliveros, Avatar Body Collision and Furtherfield, musicians, artists and researchers have been developing technical and theoretical frameworks to enhance and evaluate interdisciplinary, dispersed networked performance. While the examples provide a small contingent of practitioners worthy of inclusion in any networked performance review, they represent a cross section of contemporary interdisciplinary approaches to it. This includes diverse practices such as network acoustics and technology research, composition, improvisation, theatre and social activism.

Gesture and Dispersed Perception

Within the ocean wide area network linking Sydney, Londrina, Braunschweig, London and Munich, three of the musicians were collocated in the hub studio at the University of Technology, Sydney. All participants recorded their individual performances on video providing useful data to contrast the gestures of the collocate group to that of the remote musicians who were unable to see each other. It should be

noted that participant observation and analysis of gesture in this paper is applied only to the networked musicians. Evaluation of the video recordings revealed that where musicians could see each other, they rarely used the opportunity to coordinate their ensemble collaboration. This is in line with previous research where the video relay of networked performers primarily assumes “the purpose of providing an experience for the audience,” [1] and that dispersed musicians usually don’t visually monitor their collaborators during a performance. The role of gesture in improvisation and musical performance is well documented, and has often been seen as a principal problematic for musicians collaborating in the non-visual networked environment. However, in the context of the networked improvisatory performance, the use of a live video stream does provide participants with what Hutchins (2005) describes as a “material anchor” in their “interaction of mental...and material structure.” [2] Viewed through the lens of distributed cognition, material anchors are also present in the appearance of collaborators names or cursors in the interface.

Multimodal Improvisation

The primary focus of the Distant Presences performance was not only intercultural and interdisciplinary improvisation but to explore this as a multimodal radiophonic performance. Theoretical musings on the interplay of sound and image in audiovisual arts and experimental film are historical in their weight and depth, however recent discourses have centered on “concepts of interactivity” [5] and montage, veering away from the model of a linear celluloid medium. Live cinema mixing with music and sound art has also caught the attention of technologists keen to create novel interactive interfaces, and artists wanting to re-imagine or “redefine what cinema can be.” [6] While the collaborative domains of live cinema and music are born out of collocated gallery spaces and club culture, it is the spontaneous entwining of the two that informs its methodologies. Makela (2007) argues “what differentiates live cinema from normal cinema is the ability to improvise the narrative or concepts, to alter their course as the performance progresses.” [3] In networked audiovisual performance it is this same “interplay of the audiovisual, performed and improvised in the momentary negotiations of the participants” [6] that shape this experience.

Significant in *Distant Presences*, is how these negotiations are shaped and mediated across disciplines and between cultures. Analysis of post performance interviews and audiovisual instances reveal similarities in approaches between musicians and visual artists collaborating in cross-cultural interdisciplinary improvisation. While there are obvious differences in the creation of content, i.e. pre-performance selection of images versus spontaneous creation of music and sound, what emerges is the use of metaphor as a signifier for perception across the audiovisual spectrum. As Chion (1994) suggests, “listening with the ear is inseparable from that of listening with the mind, just as looking is with seeing.” [7] From a semiotic perspective, the research identifies what Lakoff and Johnson (1980) refer to as “ontological” and “orientational” metaphors as potential experiential signifiers in dispersed interaction. They argue that ontological metaphors give us a way to refer to experience as “ways of viewing events, activities, emotions, ideas, ect., as entities and substances”, which allow us to “refer to it, quantify it, identify a particular aspect of it [...] and act in respect to it. [8] Analogous to their given examples, rhythm, timbre and melody can be considered entities in demonstrating a musician’s experience of tele-musical improvisation. The examples illustrate ways in which dispersed collaborators can think about, and refer to such experience.

That *rhythm* is *pushing* the music to a *climax* at that point.

The *timbre* of that sound was so *cold* that it made the *melody* really *stand out*.

Orientation metaphors, relate us to our “spatial orientation: up-down, in-out, front-back, on-off, deep-shallow, central-peripheral”, however they do not “structure one concept in terms of another but instead organize a whole system of concepts with respect to one another.” [8] This gives a spatial orientation to concepts, for example “happy is up; sad is down.” [10] Applied to networked, multi-modal improvisation, such associations are significant in communicating emotion and meaning across cultures and disciplines. Examples of this emerge from the analysis of post performance interviews where musicians and visual artists reflect on their awareness of metaphor during the performance. This often occurs during complex, cognitively demanding situations in what Schön (1995) describes as reflective practice in action. Musicians and visual artists appear to process their perception and creative expression, while producing spontaneous audiovisual dialogues, revealing “a capacity for reflection on their intuitive knowing in the midst of action [...] and further to “use this capacity to cope with the unique, uncertain, and conflicted situations of practice.” [9]

This is exemplified in the opening 10 minutes as electronic musician Martin Slawig performing from Braunschweig, Germany illustrates “intuitive knowing” and awareness of spatial orientation to musical concepts, “I played a cymbal *in* time but *lost* timing inspired by the section before [...] I liked the *growth* of this moment because of the multi-layer patterns and rhythmic *speed up*, everything was there, guitar loop, bass pulse and at 12’34” *brake down* everything *deleted* and *flatline*”. Slawig is describing a section of group dynamics where the music and visual mixing build to a climax, and then suddenly drop. Sensing this same collective crescendo, Turkish bendir player Yavuz Uydu remembers, “I start playing an increasing metered 2/4 beat, I think this is what triggered everyone to *build up*”. Although most of the live cinema artists reported a cognitive priority to the visual mixing before the music, Helen Varley Jamieson also related an awareness of spatial metaphor to concepts in her strategies during the performance, “I consciously chose images that spoke to the theme in some way [...] to include the idea of temporal distance as well as spatial”. Contributing to this, fellow visual collaborator Graziano Milano notes, “it’s timbre, tonality, pace, atmosphere, melody that triggers in me visualisations of what kind of general mixes/visuals may work”. The author also argues that timbre plays a pivotal role in the perception of meaning in intercultural, and interdisciplinary improvisation. Sacks (2007) also suggests, “timbre constancy is a multileveled and extremely complex process in the auditory brain that may have some analogies with [visual] colour” [10] and this is corroborated by examples where qualities of sound appear to guide participants perceptions of audiovisual events. What starts to emerge in these statements is a relationship between metaphorical signification in sound and the creative responses of collaborators to it.

Conclusion

Distant Presences is an illustration of a successful cross-cultural interdisciplinary collaboration, achieved by combining audiovisual interfaces for an innovative performance outcome. It demonstrates the creative and cognitive challenges facing musicians and visual artists who foray into the liminal collaborative terrain of live, improvisatory, networked performance. Approaches to audiovisual improvisation are discussed and chosen examples illuminate the role of metaphor in signifying meaning in intercultural, collaborative perception and creative interaction. Evaluation of gesture within the non-visual network performance environment suggests that collaborators replace visual signifiers with extended listening practices, in which melody, rhythm and timbre become entities of meaning, fashioning metaphors of experi-

ence and expression in the minds of the participants. Viewed through a perspective of distributed cognition, visual representations of dispersed collaborators primarily act as “material anchors” [2] for the “conceptual integration” of “a shared physical and socio-cultural human experience.” [2] These representations are also present in the networked environment as interface text boxes or moving cursors.

As a model for cross-cultural collaboration, networked improvisation is unprecedented in its ability to create dialogical exchange between musicians and artists from diverse traditions and cultures. While developing technologies can facilitate these unique experiences, collaborators are faced with new creative and cognitive challenges in negotiating synchronous intercultural improvisation. This paper is intended as a contribution towards an understanding of dispersed cognition and the nature of representation in non-visual networked improvisatory performance, recognizing the need for new methodologies to mediate these emerging topographies.

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PERFORMATIVE ENCOUNTERS IN MEDIA ART: AN UNSITELY AESTHETICS

MARIA MIRANDA

Traditionally public art has been associated with work that is, to quote Claire Doherty “permanently sited, monumental and commemorative.” I present work that is made for and in public space but in contrast is neither monumental nor fixed. They work simultaneously across a number of sites, both online and offline, and utilize a range of media strategies. These practices create a different aesthetics that I call unsitely.

Traditionally, public art or art in public spaces has been associated with work that is, to quote Claire Doherty “permanently sited, monumental and commemorative.” Today I will present and discuss work that is made *for* and *in* public space but in contrast to these descriptions or definitions is neither monumental nor fixed. Rather the practices I am concerned with play out in public spaces, including the internet, but are not considered public art. They work simultaneously across a number of sites, both online and offline, and utilize a range of media strategies and interventions. They are ephemeral, networked and performative and through their mobile and ephemeral nature they create a relationship to their audience that is profoundly decentred and asynchronous. In presenting us with such different forms of engagement they are, of course, creating a different aesthetics - an aesthetics that I call 'unsitely.'

Before presenting the artworks I will briefly outline three of my key terms, these are: unsitely aesthetics, network culture and performative space.

Unsitely Aesthetics

In my PhD research I developed the term unsitely aesthetics to refer to recent work that plays simultaneously across sites, both online and offline. Unsitely refers to works characterised by their disruption of traditional approaches to site and by their unsightliness. They can often utilise a DIY approach unconcerned with issues of beauty or traditional notions of spectatorship – sometimes inciting laughter and humour to get at something else. In this sense it is a pun, referring to both the unsightly or unspectacular nature of the work while at the same time pointing to the rich history of site specificity in contemporary art. That is, unsitely pivots on the traditional history of site – from the site/nonsite of Robert Smithson’s “Spiral Jetty” to the decades long experience of site-specificity – Miwon Kwon’s book “One Place After Another: site specific art and locational identity” is an exemplary guide through this tangled and contradictory history. [1] In this way site-specificity is folded into the notion of unsitely, both acknowledging its importance and unfolding a new moment as network culture disrupts our common notions of place and of being in one place at one time. Unsitely refers to the paradoxical multi-sited-ness and situated-ness of these uncertain practices – thus calling attention to their lack of presence in any traditional sense, but rather calling upon a more “horizontal logic.” [2]

The ‘un’ in unsitely resonates with Freud’s notion of the uncanny or the *unheimlich*, in particular the uncomfortable and the ‘not at home’ feeling, which some work evokes, and that can provoke the question of ‘where’ is the work as well as ‘what is the work?’ This sense of the *unheimlich* can produce

both unease as well as an attendant laughter. Following John Dewey and his notion of art as *an* experience, unsitely/unsightly suggests a shift away from a focus on the visual to work that invites participation or engagement through media. [4]

Network Culture

The second important term is ‘network culture,’ a term I have borrowed from Kazys Varnelis. [3] With the growth of the internet and mobile telephony across the world we are witnessing new configurations of public space and public culture. In his conclusion to the book “Networked publics,” Kazys Varnelis describes this new state of affairs as “network culture” and argues that network culture has replaced the logics and periodisations of both modernism and postmodernism. For Varnelis, network culture describes a world where there is a simultaneous superimposition of real and virtual space, many-to-many distribution, peer-to-peer social networks and participatory media. These are the salient conditions of network culture, a paradigm shift away from the commonly understood idea of the information age. As Varnelis argues, today “the network has become the dominant cultural logic” replacing the digital abstractions and reductions of pure information with networked relations. [5] Following Varnelis I consider network culture as the context for the uncertain art practices I will present – as well as the context for the performative tendencies that characterise unsitely aesthetics.

Performative Space

The last term that I will briefly describe is ‘performative space.’ In his book “Loving Big Brother” John E. McGrath outlines an alternative way of understanding surveillance than the traditional account of crime prevention or the traditional critique which posits surveillance as either an invasion of privacy or part of the apparatus of a spectacularised society intent on total control. [6] Instead, McGrath proposes a surveillance space – this is in contrast to the common idea of the surveillance image – where public and private are no longer appropriate terms and our relationship to it is performative. Following McGrath’s argument for a more productive understanding of surveillance through the notion of performativity I’d like to suggest that our current condition encapsulated in the term network culture is creating a performative space of encounter.

The Projects

MTAA

The first project I will present is MTAA’s “One Year Performance Video (aka samHsiehUpdate)” from 2004. This work shows immediately the enormous shift in practice and aesthetics from traditional performance art of the 1960s where the presence of the body was of supreme value, to the layered and networked sense of ‘presence’ we live with today. As James Meyer suggests, it was the expansion of telecommunications and increasing mediation that brought forth the well-known 1960’s obsession with presence.

Presence became an aesthetic and ethical *cri de coeur* among the generation of artists and critics who emerged in the 1960s, suggesting an experience of actualness and authenticity that would contravene the depredations of an increasingly mediated, “one-dimensional” society. [7]

MTAA's elegant and humorous project demonstrates this shift not only in art practice but also in the larger social world where the idea of presence and what is "live" have become blurred, extenuated and layered. Media is now part of the everyday to such an extent that the once easy separation between (authentic real) life and the mediated is quite impossible.

In the early noughties MTAA (M. River & T. Whid) made a series of works called "The Updates." These works riffed on seminal performance art from the 1960s and 1970s, "updating" them for our current networked era. The update "One Year Performance Video (aka samHsiehUpdate)" reworks Sam Hsieh's "One Year Performance 1978 -1979 (aka Cage Piece)." Like the logic of Liam Gillick's 'What if' scenario-thinking it asks, what if Tehching Hsieh made this piece today, in the public space of the Internet? [8]

In the original work by Hsieh, the artist lived in a cage for an entire year. The cage was built in his downtown New York studio. Hsieh committed himself to a regime of extreme deprivation where for the entire year he didn't talk, read, listen to the radio or watch TV. To pass the time he took photos of himself and marked the wall of his cell – like a prisoner in solitary confinement. His physical needs - food and sanitation - were attended to by an assistant "with whom he did not exchange words." In contrast to MTAA's Update, the work was enacted in an essentially private space, that of the artist's studio, with no audience. MTAA's update was commissioned by Turbulence in 2004, and has been available online since then. However, whenever you access this work the artist statement announces the date you logged on as the start of the work. In other words, the work begins when each viewer commences to view the work.

For MTAA, the work has shifted from the "act of living in a cell" to "images of ourselves living in a cell."

We've transferred the onus of a 1 year commitment to the work from the artist to the viewer. The piece will be realized fully only when a viewer runs it for one year. ... In the work, we mimic endurance without doing the labor. We also know the audience can just close the browser and walk away. No one needs to suffer on this one. [9]

This is a crucial shift – but doesn't necessarily mean that mediation is merely the viewing of images. If McGrath is right, rather than images this performance creates a performative space between the viewer and screen events – one that is open to possibilities, just like Austin's happy performatives. This sort of media artwork accessed and experienced through the internet can be understood as creating a performative space. This is distinct from previous understandings of the internet as cyberspace, where the internet was a separate space apart from everyday life, a space that took you into another realm. Instead MTAA's updates operate as a constantly dynamic space of play, and one which sits beside or even inside the everyday domestic and work spaces of one's life. As McGrath points out in relation to "uptake" and surveillance space, there is a productive gap between the work and the person experiencing the work, thus allowing for an open and dynamic relationship rather than a closed work of set meanings or merely documentation of past events. It is this gap that is productive, as it creates the possibility for a space of performativity "a space between the possibility of sense and the possibility of tyranny of sense." [10] In other words it brings a sense of freedom from the tyrannies of representation that call for absolute truth.

With MTAA's straight-faced performance new questions arise. What is the relationship of audiences to online distributed work? What is the value and importance of documentation historically and today as it is being reconfigured with online performance? And crucially the work throws out a challenge - is this a documentation or a 'live' performance? What can 'live' mean in such a mediated situation where the

time of the performance is totally separate from the time of the viewing? The dislocations and performative nature of the work that these questions imply also make this work unsitely – its existence dispersed across time and space.

NEVER BEEN TO TEHRAN

In the project “Never Been to Tehran,” Andrea Grover and Jon Rubin invited twenty nine international participants to contribute photographs of the city of Tehran as they imagine it to look – on the condition that they themselves had never been to Tehran.

Imagine a city that you've only seen in reproductions or perhaps have merely heard about. A place, like many others, that only exists for you through indirect sources & media; the nightly news, hearsay, literature, magazines, movies, and the internet. Using these second-hand clues as firsthand research materials... Contributors will upload their photos daily to an on-line photo-sharing site, which will be projected as a slideshow simultaneously in galleries and public spaces around the world (including Tehran). [11]

This project utilises a sort of reversed site-specific logic where participants imagine a place, a specific place that they themselves have never seen or visited, through another place, which is their own. In contrast to the previous work where the visibility of the artist was a central pivot of the work, the artist is not visible in these photos. Rather than the artist's body as a phenomenological body of presence, this project works from and through the many different artists' global positions that make up the mosaic of images. The photos, all 408 of them, evoke a place through landscape, decorative motifs, ephemeral objects from daily life, the flotsam and jetsam of the everyday as well as the monumentally built environment. It is a networked collaboration that creates a dynamic shifting mosaic of images of not just an imagined Tehran, but conversely, of the people and places that participated. The specificity of where-in-the-world each image was taken is highly significant. In the work, Tehran can be the stony mountain landscapes of New Zealand, the deli windows of Brooklyn, the carpet sellers in Italy, the diamond-shaped paving stones in Denmark, or stacked supermarket shelves in Japan. This very tension between the pictured Tehran, the imagined Tehran and the 'real' Tehran can create, for viewers not in Tehran, a range of responses – at times the images evoke a sense of the absurd, they can seem uncanny, artful and inventive, wistful, melancholic or simply delightful and oftentimes they provoke a laugh out loud response. In this way the images are obviously not 'real' representations of Tehran, rather they perform the place called Tehran by calling forth images and scenes from the immediate world of each artist, in a non-stop kaleidoscope one could call 'performing Tehran.'

SEARCHING FOR RUE SIMON-CRUBELLIER

The last work is a work I made in collaboration with sound artist Norie Neumark called “Searching for rue Simon-Crubellier.” It is the first project in a trilogy of work exploring actual and imagined relations to place and in particular mediated, networked public space through performative encounters. It was begun in Paris in 2004 while on a residency at the Cité International des Arts.

“Searching for rue Simon-Crubellier” takes as a point of departure the experience of being Australians in Paris and reading George Perec's book “Life a user's manual.” In this book Perec creates a puzzle of a novel set in a building located in the 17th arr. at number 11 rue Simon-Crubellier. Early on in “Life a

user's manual" Perec describes in detail exactly where this street would be. [12] Following Perec's directions we set out from the Cité and began our search in the 17th arr. In the first part of the work we 'performed' the encounters of Australian travellers in a foreign place looking for a particular street by stopping strangers in the street to ask directions. We were directed to one official location after another – the local council, the national archives, the library of maps, the planning department etc, until a month later, we ended up at Boulevard Morland, one block from the Cité, at the Commune de Paris in the department in charge of map-making for all of Paris.

In the course of this project – it was a month long process – we came to understand our ongoing activity as "performative encounters," rather than performance art or conceptual art, and the video and audio material as no longer to be considered material just to make a work later – it too was the work. In a sense we were not documenting a separate event. The documenting was the event. It was at this point that the significance of media in public places became apparent. We realised that the media we carried was essential to having these sorts of encounters, and the audio and video apparatus created a performative space of encounter. For McGrath, non-performative representations allow the viewer an external relationship to the represented via representation, performative space brings the viewer into the space constructed. As in performative language, ... the space does not exist without the viewer/auditor's implication." [13] And so it was with us.

This project has been exhibited several times, displaying the accumulated artefacts of its ongoing search, which makes each exhibition of the work distinct, prompting the question 'where is the work?' Is it the performative encounters on the streets of Paris? Is it the online Google searches that are undertaken for each exhibition? Is it the exhibition of the accumulated artefacts? The performative encounters invited people to play for a moment. It was an intervention into public space, yet we didn't consider it a participatory project. Rather our interest was in the possibilities of encounters with strangers – thus performing our own sense of Paris, in other words *performing Paris*.

In Conclusion

In using the art historical term "site" to understand these works that are now playing out across public space, including the internet, I want to point to a paradox that looms into view in both current practice and our actual lived experience – the paradox of being in a place and not in a place; of being located and elsewhere at the same time. I have used "site" to focus on this paradox as on the one hand it foregrounds the lived experience rather than the technology, and on the other it troubles the notion of "place" as it is used by writers intent on a singular or essential relation with place. Although site suggests a fixed place, I am using unsitely to unhinge this fixity and to suggest a troubling and opening of the place of the work of art. Hence I use unsitely to evoke a space of tension, ambiguity and potential.

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PLAYGROUND GAMING WITH WII, KINECT AND PROCESSING

Grethe Mitchell & Andrew Clarke

This paper is a case study in the design and development of the “Game Catcher” - an interactive application produced as part of an AHRC “Beyond Text” Major Grant project that uses open source software (Processing, libfreenect) and hacked games hardware (Kinect and Wiimote) to create a low-cost motion tracking system that allows the recording, playback and analysis of children’s playground games in 3D.



Fig 1. Hand positions in a clapping game (© Grethe Mitchell & Andy Clarke)

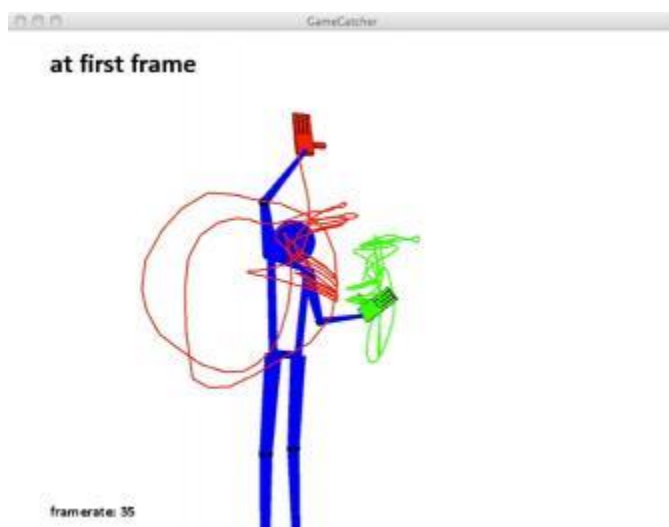


Fig 2. Visualisation of the path of the hands over time (© Grethe Mitchell & Andy Clarke)

INTRODUCTION

This paper is a case study in the development of the Game Catcher, a low-cost markerless motion tracking system produced as part of “Playground Games and Songs in the Age of New Media”, a two-year project funded by a large grant from the AHRC as part of the Beyond Text Programme.

The Game Catcher uses open source software (Processing, libfreenect, DarwiinRemote, OSCeleton, Simple-OpenNI) and hacked games hardware (both the Microsoft Kinect sensor and Nintendo Wiimote) to

create a low-cost markerless motion tracking system that allows the recording, playback and analysis of children's playground games and movement in 3D.

The following paper focuses on some of the technical aspects of the project, particularly the advantages of using videogame hardware and open source software to produce this application. Readers requiring more information on the archiving and visualisation aspects of the application are directed to our other papers [1] [2] and to the project report. [3]

The development of the Game Catcher was supervised by Grethe Mitchell of the University of East London (now at the University of Lincoln), and the final version of the application was developed by Andy Clarke.

PROJECT AIMS/CONTEXT

Recording movement for archiving and analysis is a common task in the Arts and Humanities. Approaches include written descriptions and drawing. Video recording technology is also commonly used, but although it is cheap and easy to use and therefore has advantages at the recording stage, it is more cumbersome when it comes to analysis. For instance, it may leave some details lost (though being out of shot, filmed from too far away, or obscured (either by the subject's other limbs or by other participants). Motion capture has many advantages over video, in that it allows the movement to be viewed from any angle or distance, not just the one that it was recorded from. There are, however, also negative aspects – such as price, availability, and the complexity of configuration and operation – which make them generally unsuitable for use in Humanities research projects.

We felt that a low-cost markerless motion tracking system would be able to combine the price/ease of use of video with the benefits of motion capture. Also, having researched and written about the appropriation of videogame hardware and software, [4] we felt that the new forms of motion sensitive videogame hardware (such as the Wiimote) could be adapted to form the basis for such a system, particularly as this approach would build upon the other advantages of videogame controllers such as an extremely favourable price to performance ratio, easy availability, robustness, familiarity with users, and so on.

The Game Catcher was developed as a fully functional proof of concept application, designed to address the preservation, visualisation and archiving of movement and to fill this price/performance gap between video and motion capture. In parallel, we also wanted to create a playable game which would allow a child to record their (movement-based) game and then play "against" this recording. Our aim here was that the computer game and the research tool could form a virtuous circle, with the playability acting as a reason for children to keep playing with the Game Catcher, thereby also providing more data for the researchers. The process of making the Game Catcher playable as a game also made us look at the issues involved in bringing "real world" playground activities into a computer environment, and made us think more consciously about what makes real life playground activities – and computer games – enjoyable.

TECHNOLOGY

To fulfil its stated aims of allowing the recording and playback of clapping games, the Game Catcher had to perform two different tasks: (a) track the position of the hands in 3D space; and (b) detect the orien-

tation of the hands. From this information, the path of the hands could be determined (and reconstructed in “playback” mode) and claps could be identified – whether they were player to player, player to computer, or computer to computer claps. This all had to be done with a sufficiently high frame rate and accuracy, and sufficiently low latency, for the data to be useful as research material and enjoyable during play. In addition, the Game Catcher had to be usable by researchers “in the field” – meaning that it had to be simple, robust, not require an excessive amount of technical knowledge to set up and use, and provide resilient tracking under a variety of lighting conditions and environments.

Processing was chosen as the programming language for the Game Catcher because of its ease of development, its focus on creative computing, and its extensive collection of pre-existing contributed libraries (and active development of new ones). If we had needed a C-based alternative, we would have probably used OpenFrameworks, for the same reasons.

During the course of developing the Game Catcher, we used a number of different solutions before adopting a “best of breeds” approach which used the Kinect sensor to track hand position and Wiimote controllers to track hand orientation. This proved ideal, exploiting the strengths of each system. One of the issues that we came across (and perhaps failed to fully appreciate in drafting the proposal) was the difference between a controller like the Kinect that does motion tracking and one like the Wiimote which is merely motion sensitive. The Kinect detects hand movements by tracking changes in their position whereas the Wiimote only sensing changes in acceleration and therefore has no idea of where the hand actually is.

The Nintendo games are designed to minimise or conceal these limitations, but no such workaround was possible with the Game Catcher. As a result, it was necessary to adopt a hybrid approach which used the Wiimotes for the task that they were most suitable for (determining the hand orientation) and explored alternative solutions to the issue of tracking where the hands were in 3D space. This gave the Game Catcher a theoretical performance of around 3mm in the XY axis, 1cm in the Z axis and 1° in orientation. In practice, unavoidable system noise in the Kinect depth map reduces the XYZ accuracy slightly from these ideal figures, though it still remains well within acceptable levels. The accuracy with which depth is measured varies, and when an object is far from the Kinect, its movement is measured in larger steps than when it is close. The figure for orientation is likewise the raw measurement and in some hand orientations the Game Catcher makes the hand snap to 90° to avoid gimbal lock issues.

The authors have previous experience in video tracking, having used applications such as STEIM BigEye and Danny Rozin’s TrackThemColors Director xtra within the context of dance and technology. As a result, they were aware of the shortcomings of video tracking – being too easily affected by outside conditions such as the brightness and colour temperature of ambient lighting or the clothing of participants.

As a result, we rapidly switched to an innovative approach which used Wiimotes not only to sense the orientation of the hands, but also to track their position. We attached an infra red LED to the Wiimotes in the player’s hands and used a third Wiimote as a camera pointing at the player to track the position of these LEDs. The advantage of this approach is that it is very fast as the Wiimote has a dedicated chip optimised to do this image analysis in hardware. The tracking is also robust and resilient to lighting conditions, etc. as it is tracking infra red light, rather than visible spectrum. The LED point source does not allow tracking depth and we therefore planned to use triangulation to determine distance, an approach demonstrated by researchers at the University of Cambridge. [5]

Although the Kinect was hacked on its first day, it took a while before Processing libraries by Daniel Shiffman and Paul King became available. These only provided access to the raw depth map, not to the

player skeleton, so bespoke hand tracking code was necessary. This approach provided an extremely high framerate – up to 100fps, even when tracking two hands – though self-occlusion was an issue, with the tracking becoming confused and tracking the wrong body part when, for example, a hand was temporarily hidden behind the other arm.

Because of this, we switched to OSCeleton as soon as it was available as this provided access to the player skeleton. OSCeleton ran as a separate command line program, communicating with Processing using the OSC protocol. This added additional complexity in setup/use and was felt, in the end, to be inappropriate for the Game Catcher if it was, as intended, to be useable by researchers in the field. For instance, when OSCeleton experienced a segmentation fault, this could leave both it and the Game Catcher frozen. We therefore switched to the Simple-OpenNI library.

As both OSCeleton and Simple-OpenNI can track multiple users, we developed and tested a multiplayer version of the Game Catcher, focused on other movement-based playground games such as skipping, hopscotch, dance routines etc.

ISSUES

There were a few issues with the Wiimote from a technical point of view. It does not, on its own, track rotation about the Y axis and suffers from a gimbal lock problem when pointed vertically upwards. This meant that we could not distinguish between two key hand positions: the palm out, fingers up (position 3 in large image) and the similar position with the palm facing sideways (position 5). In addition, the rotation could flip uncontrollably by 180° when the hand was in these positions.

Normally, the Wiimote relies on the Sensor Bar and/or the Wii Motion Plus to solve these problems, but neither was suitable for the Game Catcher. The first would require the user to keep their hands pointing at the bar, which clearly unsuitable for a clapping game, while the latter added too much additional bulk and weight.

An alternative approach was used. By paying attention to the previous position/orientations of the hands and the limits of human anatomy/physiology, we could add an additional level of interpretation to the raw data received from the Wiimotes and eliminate hand orientations which were either physically impossible or made no sense given the context of a clapping game. For instance, when the hands are vertical (fingers pointing up) in a clapping game, it is unlikely that the player's palms are facing their body as this is not a common move and even if they were in this "palms facing body" pose, they would have gone through some clearly identifiable intermediate positions to have arrive here.

This "filtering out" of non-used positions in the electronic environment is one of our "design solutions" of the development, based on the "perceived affordances" [6] of the system and the properties and affordances of the clapping movement ("real" and electronic), as well as on the affordances of the "real world" environment.

The other main technical issue that we faced was the relative weakness of Processing in rendering certain types of 3D graphics. In computer games such as the Wii Sports boxing game, the player's avatar is seen from behind in a ghostly form. This is an established convention which we wanted to use in the Game Catcher when the player is clapping with their recording, but we found Processing unable to render the semi-transparent 3D graphics needed for this effect. A workaround, using a wireframe avatar was felt to be sub-optimal.

The Wiimotes are convenient for holding, but are a little large to be comfortably mounted on gloves (so as to track clapping, for instance). Having done our prototyping using the Wiimotes, we are now looking at using the Seeeduino Film to engineer a smaller alternative.

VISUALISATION AND ANALYSIS

The raw movement data is saved in a plain text format and records the X/Y/Z/roll/pitch/yaw of every body part in every frame along with a timestamp (a sound file is also recorded of the clapping rhyme/song which plays back in sync with the movement). This data file is used in replaying the game, and is also designed to be easy to analyse. The Game Catcher provides an example of this analysis, having a built-in “visualisation” mode (see small image) which shows the path of the hands throughout the entire game. This image can be rotated and viewed from any angle and played, paused and rewound at will.

A natural extension of this would be to be able to view two recordings side by side for comparison or to superimpose the paths of one recording over another. Both of these would assist greatly in identifying similar clapping games or spotting when a variant of a game has emerged. Currently these are difficult, time-consuming, tasks relying on the manual comparison of video recordings, which may have been taken at different angles or be of clapping games performed at different tempos.

Computer analysis is also possible. Identifying clapping games from the analysis of video footage is complex, [7] but doing the same from motion data (such as that collected by the Game Catcher) is feasible as claps can be identified from changes in the velocity of the hands, changes in direction, or proximity to one another. These same principles and solutions can be applied to many different movement-based activities.

CONCLUSIONS

The Game Catcher is a fully functional prototype, working both as a computer game and as a research tool. It has proven the viability of a tracking solution “in-a-suitcase”, an exciting development as it means that ephemeral movement data can be captured, analysed and conserved at low cost, without extensive technical knowledge.

This has interesting outcomes for research in the Arts and Humanities. In terms of development, the Game Catcher allows for a low-cost visualisation mechanism allowing performers of all types (dance, music, theatre, circus etc) to see the shape and position of their activity in 3D space, thus opening up new avenues for artistic development and performance improvement.

In terms of research, the Game Catcher is particularly interesting to the arts and humanities disciplines, where research often takes place in-situ, rather than in a pre-determined, specially designed space as is the case for some medical or sports movement research, or in the entertainment sector (e.g. film and videogame production) where high-end (and expensive) motion capture studios are commonly used.

The above outcomes – and overall process of developing the Game Catcher – have led us to consider more deeply how movement is studied across disciplines, and whether these techniques are shared. From our research, it would seem that the techniques for recording and documenting movement are patchy, with bodies of knowledge siloed within certain fields and little known (or little used) outside of that particular field. For instance, formal movement notation systems such as Labanotation are used

within dance, but not outside of it, even though it could have application elsewhere. Commercial motion capture systems are likewise used in the entertainment industry and in high-end medical or sports research and development, but are not generally used in the arts and humanities.

A follow-on project by one of the authors (Grethe Mitchell), also funded by the AHRC, is addressing this issue. It will organise a symposium and book allowing the exchange of best practices across all disciplines with regard to the recording, analysis and archiving of movement-based activities (in all their forms).

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NEW AESTHETIC ENERGY INFRASTRUCTURE AND THE LAND ART GENERATOR INITIATIVE

Elizabeth Monoian & Robert Ferry

The Land Art Generator Initiative addresses public art within the urban fabric of the sustainable city. The goal of LAGI is to design and construct a series of large-scale site-specific installations that combine art with utility-scale clean energy generation. The artworks utilize the latest in renewable energy science and innovate the application of new technologies. www.landartgenerator.org



Fig 1. Freshkills Park, Staten Island, New York City, Spring 2011. View of East Park from North Park. Site of the 2012 Land Art Generator Initiative Design Competition. Photo by Robert Ferry.



Fig 2. Windstalk (2010) Atelier dna: Dario Nunez Amení, Thomas Siegl; New York City, USA.

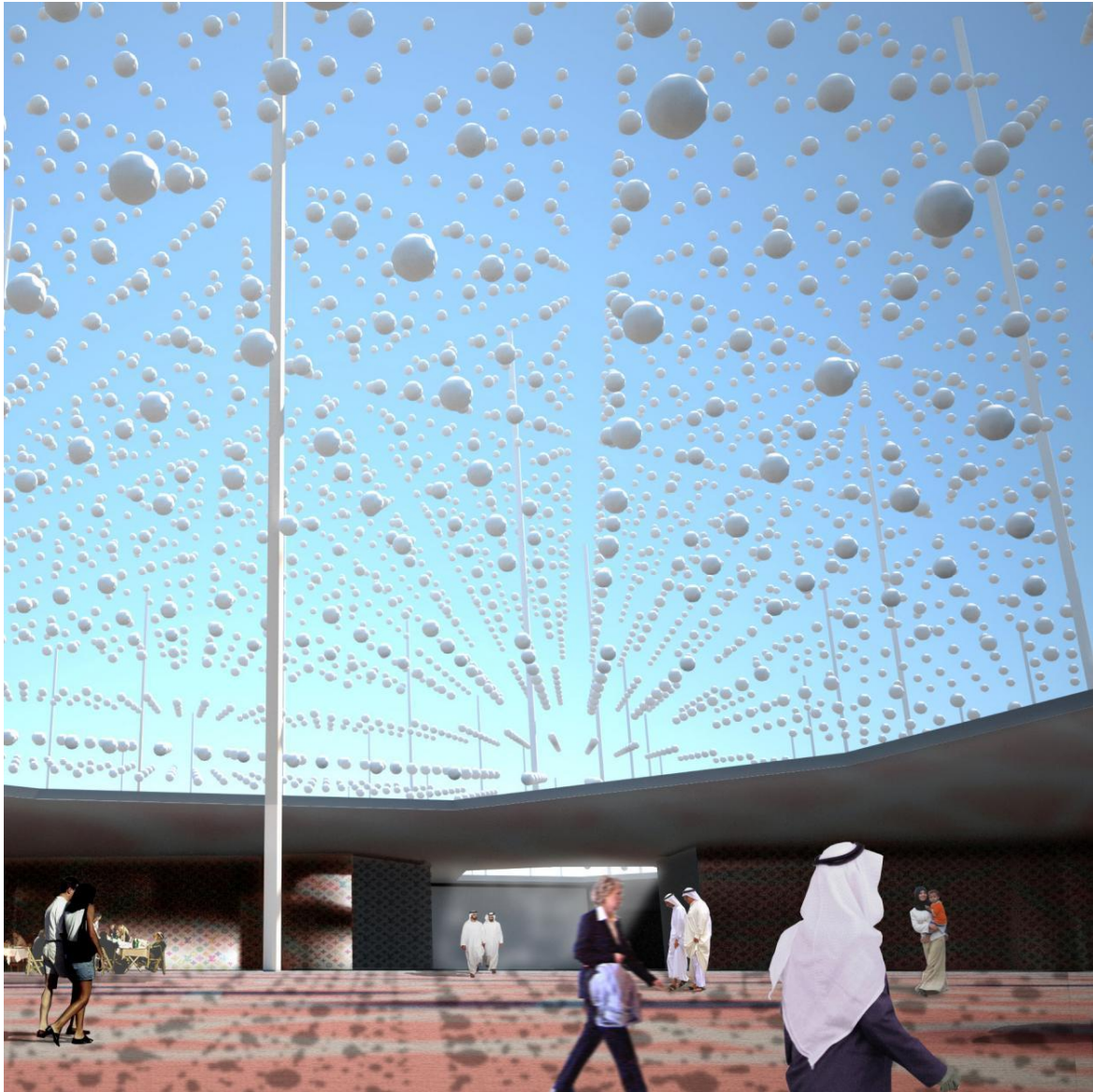


Fig 3. PV Dust (2010) George L. Legendre, Emanuele Mattutini, Jean-Aime Shu, Alfonso Senatore; London, UK.

Imagine yourself walking in a large park at the edge of the city. In the distance, an object appears to rise organically from the landscape. Its armatures and folds relate to the composition of the setting. Looking closer, the large object makes you think of the complexity of patterns that exist in the natural world while at the same time it inspires an awe of human invention and ingenuity. The geometries of the sculptural elements seem to respond to the sun and the wind.

When you reach the observation platform the vision comes into perfect form, like a painting in a frame. As you watch the way that it reacts to the forces of nature, you think about the interconnectedness of human activity with the earth and the delicacy of our shared ecosystem.

You are surprised to learn that the beautiful object that has so captured your attention is also a power plant harnessing the energy of nature in the creation of carbon-free megawatt-hours that are at that very moment providing electricity to thousands of nearby homes. You stay for a while listening to the energy conservation discussion that is going on there that day, stealing glances toward the artwork as it moves to follow the sun.

Is it possible that in the future, all human endeavors could be fuelled by clean renewable energy? And that the systems which generate the energy could be designed to be beautifully and seamlessly integrated into the fabric of our biotic and cultural ecosystems?

While contemplation on the condition of our planet can be dispiriting, it is important to remember that remedies exist. At our most optimistic we can even see ourselves in the midst of a new revolution—one that puts sustainable resource management above planned-obsolescence consumerism.

To get there, we're going to have to convince a great number of people to embrace the ideas associated with the change, clearly understand the need for it, and see its inevitability. This takes a heightened awareness of the cultural drivers of change. The investment in time and economic resources that change requires should be justified in the great return in cultural and economic wealth that the change brings with it.

We've placed our focus on one part of the equation—that of energy generation—because it is critical to accomplishing a harmonious transition and because democratized access to clean energy has the potential to dramatically increase the standard of living of everyone.

When most people think about renewable energy a few things come to mind. We might picture dark blue solar panel arrays or large wind turbines in the ocean and lining mountain ridges. The form of these objects is derived almost entirely from the engineering processes that have made them function more efficiently through each generation of technological advancement. Consideration of efficiency and cost per kilowatt capacity has driven the appearance of renewable energy technologies for two reasons. First, the cost of energy is relatively low in a global market that subsidizes non-renewable fossil fuels and writes off externalities, [1] and renewable alternatives must strive to compete on those terms. And second, large-scale energy generation facilities (i.e. coal-fired power plants) have historically been located far enough away from the city that aesthetics were not of utmost importance.

Functional and mechanical considerations should always remain an important priority of good technology design, and it is imperative that we implement strategies that will ensure universal access to affordable energy. At the same time, we may be wise to question the ability of advances in renewable energy technologies to reach their greatest potential if their physical forms continue to exist entirely outside of aesthetic and cultural considerations. This question is reinforced by the fact that the process of harnessing renewable resources such as the sun and the wind often requires that energy generation facilities be located in more visible locations.

The science of renewable energy may soon find the way to cost parity with conventional fuel resources, and by some measures, they already have. But the popular adoption of new sustainable technologies will require that they have the ability to appeal to people on an emotional level. It will require a popular appreciation of the value inherent within a shift in energy resources and not just of the dangers inherent in not shifting.

Meanwhile, the dangers are quite real. With climate, environmental, and health effects of extraction and combustion on the one hand, and the finite nature of fossil fuels and uranium on the other hand, it is imperative that the next few decades see a rapid transition to renewable alternatives. One of the leading obstacles to greater adoption is the indifference or lack of understanding of policy makers, stakeholders, and community leaders. We therefore should look to all means with which to educate and influence popular opinion.

Every advancement in technology comes with its own complex set of risks and potential consequences and should be well considered ecologically before being applied universally. [2] The incredible bounty of the Earth, if managed sustainably and in harmony with nature's balance, can lead to a heroic triumph over poverty, starvation, and suffering.

Instead, our ability to tamper with the balance of nature and to squander the precious resources available to us has been a tragedy of epic proportions. A short-list of the damage done includes all of the polluting effects of mining and extraction industries, the "resource curse" stifling freedom and progress in post-colonial nations, effects of airborne and waterborne toxins on human health, habitat destruction and species extinctions, wars waged over resources, increased risks to coastal populations, loss of fresh-water resources, agricultural instability, increased desertification and deforestation, ocean acidification, and global economic instability.

This list of 20th century tragedies is in great part due to the historically brief anomaly of easy access to conventional crude oil (~1860-2060). But it also has to do with the corresponding cultural memes that proliferated with and as a consequence of the technological and scientific expansion that was fueled by oil economies.

All along the way art has had a pivotal role to play although it may be often overlooked. In 1909, the Futurist manifesto, [3] along with other contemporaneous movements, gave added momentum to the sentiment of the triumph of man over nature. Europe was gripped by a collective progress-euphoria, as it reveled in the excesses of its scientific and industrial triumphs. It was that same year that humans reached the North Pole, and six years previously the first successful flight had heralded victory over the sky. The world had been mapped and catalogued and ideas about time and space were being challenged. This euphoria of progress is an addiction from which 100 years later we are still recovering. The Futurist manifesto itself was a seduction to the thrilling and fleeting ecstasies that come from narcissistic cultural self-evaluation, environmental destruction, squandering of resources and the waging of war. Above all, its lesson is the ability of art to contribute to change in the world.

While declaring the greatness of speed and progress, Futurism also equally declared the greatness of humanity. But what it did not bring into the fold of its political message was a concern for the well-being of the planet or notions of "humanity" as being defined by a sense of empathy or compassion.

The intellectual profundity of the idea of "Greatness-In-Newness" that was born of those first decades of the 20th century played a critical role in art and design theory that was to follow. On the positive side of the bargain, this grand movement that has seen various iterations and reinterpretations over the last century has consistently questioned the nature of art. The application of its higher ideals has given us the ability to invent spectacular otherworldly creations by fusing together disparate existences into wonderful or shocking manifestations.

On the negative side of the bargain, artistic glorification of mankind's triumph over nature has arguably contributed, if not to the neglect of our obligation to nature, at least to a distraction from it. In the meantime, we have arrived in the 21st century at a somewhat desperate place in which an updated vision of our future may have no place for human life at all on a planet that has been heated up by our combustion and raked clean by our endless mining for metals and fuels in our insatiable and un-moderated quest for speed and convenience.

A countermeasure of serious import to the Futurist ideas of "Progress for the Sake of Progress" and the "Greatness In Newness" has been the dawning awareness, since the middle of the 20th century, [4] of the serious situation that our addiction to unabashed industry and the fast life of unbridled consumption has placed us—and the planet. Artists have been pivotal in expanding this awareness to the critical mass required for action.

This use of art to expose truths and influence solutions continues with the expanding reach of eco-art, environmental art, and art as social practice. Artists are using the tools at their disposal to educate the viewers, readers, and users of their work about the ethical considerations that are so relevant to popular human behaviors. Art and design have been able to enlighten people about a broad range of social and environmental issues and to instill awareness about the products we buy, the foods we eat, and the energy we consume.

In no small part this is being done through art that employs technology, for example visualizations of climate data or air pollution. [5] Technology is being glorified and used in art with a new purpose and with awareness of the potential harming effects of human behavior on the delicate balance of the natural biosphere.

Meanwhile, the growth of social practice art presents a path to overcome the limitations of didacticism. It is good to teach, but the best methods of teaching have always been demonstrative. How can art 'do' as well as 'be'? With the application of social practice to infrastructure art, the 'do'ing certainly implies a partnership with technology.

Renewable energy technologies have the ability to rise to the occasion that is provided by these two conditions of the contemporary art world: social practice and technological integration.

The Land Art Generator Initiative is creating a dedicated platform for public art as sustainable energy infrastructure. [6] The project offers the opportunity for collaborative teams of artists, architects, landscape architects and designers, working with engineers and scientists, to create new ways of thinking about what renewable energy generation looks like and how it relates to the overall fabric of our constructed and natural environments. It calls on interdisciplinary teams to conceive of large scale site specific artworks that provide renewable electricity to the city at a utility scale (equivalent to the demand of hundreds of homes)—offsetting thousands of tons of CO₂ and providing an iconic amenity for the city.

The outcome of the 2010 design competition exemplifies how interdisciplinary teams can come together to create truly innovative and pragmatic solutions. Hundreds of submissions came in from over 40 countries around the world from design teams that included many top international artists and design firms.

The Land Art Generator Initiative has partnered with NYC Department of Parks & Recreation for 2012 to hold an international design competition for large-scale works of site-specific public art for Freshkills

Park (the former Fresh Kills landfill) in New York City, which, once reclamation is completed, will be a cultural amenity almost three times the size of Central Park.

Jurors include: Dr. Henry Kelly, Acting Assistant Secretary and Principal Deputy Assistant Secretary for the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy; Bjarke Ingels, Founding Partner of BIG | Bjarke Ingels Group; Patricia Watts & Amy Lipton, Directors of Ecoartspace; the Public Design Commission of the City of New York.

Following are two examples from the 2010 Land Art Generator Initiative design competition that illustrate the potential for innovation that lies in interdisciplinary collaboration.

The Windstalk team, led by Atelier dna in New York City, [7] arrived at a solution to harvesting the power of the wind that had never before been considered. They were inspired by their observation of nature, specifically the way a field of wheat or tall grass blades wave in the wind. Rather than relying on a rotor with blades attached, they conceived of a set of stalks that would move under the power of even the slightest breeze coming from any direction.

By placing piezoelectric generators along the stalk and a torque generator at the base, the Windstalk design has the potential to generate more electrical output per square meter of land area than a conventional horizontal-axis wind turbine (HAWT) array. The reason is that HAWTs must be placed far enough apart so that the wind disturbances and vortexes that each turbine creates in its wake do not affect the efficiency of the other turbines. Windstalks can be placed in close proximity to one another.

An innovative solution for solar power came from the PV Dust project from an interdisciplinary team in London. [8] By utilizing a new solar product called Sphehar(TM) by the Kyosemi Corporation, the team conceived of a three-dimensional array of spherical solar receptors that increases the incident surface area of the installation.

The result is that the design requires 57% of the land area per KW capacity output when compared to an array of flat photovoltaic panels, while maintaining use of the ground for other purposes such as farming or recreation.

These designs go beyond their conceptual and aesthetic innovation to include engineering innovation. But even short of that, the application of existing technologies in new and artistic ways creates cultural innovations, which can be equally powerful as drivers of change.

Because the renewable forms of energy generation such as solar and wind do not pollute in their daily operations, they are more likely to find their way into proximity with residential and commercial neighborhoods. As this has already started happening, there has been some push back from local communities in terms of aesthetics, for example with neighborhoods rejecting wind turbines that they can see from their backyards (the so-called NIMBY effect). [9]

For while such installations do not billow smoke, the argument can be made that visual pollution is no less an impediment to the proliferation of clean energy inasmuch as detractors can point to “not in my backyard” examples of installations that have negative impacts on real estate values and community cohesion.

Cultural innovations via infrastructure art can provide new tools for city planners with which to integrate renewable energy systems into the built environment while addressing such public concerns. And they can provide investors with new opportunities to capitalize on projects that provide multiple revenue generating engines (a power plant that also generates money from tourism for example, or that is partially financed as a cooperative by the community).

We can envision a day when renewable energy generating artworks will add cultural and economic value to public spaces around the world, while giving us cause to feel good about our creative stewardship of the environment.

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FROM ARCHIVE TO RETROSCOPE AND BEYOND – PUSHING FORWARD RESOURCE DEVELOPMENT

CATHERINE MORIARTY

This paper presents a chronology of image digitization projects undertaken by the University of Brighton Design Archives and discusses the relationship between this work and archival description in a conventional sense. It suggests a coalescence of, and describes a tension between, information management standards and the curatorial and user innovations that networked archives might provoke.



The Golden Egg Restaurant, London, 1966. (University of Brighton Design Archives).

The intention of this paper was to discuss the outcomes of a collaborative project between the University of Brighton Design Archives and the independent web resource, The Retroscope. However, the project is yet to attract funding and so the following takes the form of a discussion setting out the thinking behind the project and its background. It focuses on ideas about location; of archival photography as described in hierarchical arrangements; as distributed electronically in the form of digital surrogates; and, ultimately – doubling back on itself, so to speak - as the representation of things in the real world at a

particular time and place. It suggests a coalescence of information management frameworks and curatorial innovation of a radical order.

I first saw analogue photographs from the University of Brighton Design Archives represented online in 1999. It was an extraordinary feeling to see these digital images. 100 or so photographs from the archive were scanned for a project in Scotland, the Scottish Cultural Resources Network (SCRAN), and four things struck me immediately: the greater value of our material when located alongside that from other archives and museums; the immediate visibility of photography usually accessible by appointment only; the scale of the potential audiences who could now see it; and, significantly, the importance of place. The latter requires some elaboration.

The photographs contributed from the archive to the SCRAN project depicted Scottish products displayed at the 1947 Enterprise Scotland Exhibition held in Edinburgh. The supporting caption information on the back of each print was incorporated in the metadata of the corresponding digital file and this included the name and address of the manufacturer of each represented product. It became immediately apparent that this information could present a map of manufacturing in Scotland in the postwar years, and that this location data would be of considerable interest particularly to local and business historians. The photographs that had been acquired as part of an archive of design now became re-activated in a new digital environment, with material from other collaborators and as part of a project with a mission to reach wide audiences. Since then, however, the issue of location has re-appeared consistently, sometimes as a dilemma, and more recently as a great opportunity. This paper maps this process.

In a similar way to the initiative described above, subsequent educational digitization projects in which the Design Archives participated involved delivering sets of images scanned from our photographic holdings that were then added to an amalgamation of material from different sources principally the Visual Arts Data Service and more recently, the Joint Information Systems Committee Media Hub. In the agglomerated pools of data offered by these services, we envisaged our images appearing in the results lists of varied research enquiries and reaching audiences with whom we would not have engaged alone. However, an issue that soon became apparent centred on the context of each digital image. For unhitched from the analogue parent, it was difficult to understand the place of the photograph in its home archive; indeed, its archival arrangement – to use the proper term – was never explained. These images were orphaned, detached from their original context and offered-up as separate digital objects.

It became clear then, that the dynamism that digital surrogates of archive photography enjoy is both a blessing and a curse. Indeed, in some ways they seem too free, in that they are removed from their archival hierarchy and presented in a flattened 'chocolate box' thumbnail arrangement, from which the viewer cannot navigate back in order to understand the object in its home environment. In other words, the viewer cannot understand which print or negative is placed before or after it; or how long the sequence is and what its overall purpose was; or, which series or collection group it forms a part of. This is precisely what the International Standard of Archival Description ISAD(G) was established to explain. Building on established principles of archival practice, it is an information architecture that is a flexible matrix, that accommodates a vast array of different multi-level scenarios, from small collections relating to the life or work of an individual, through to the complex structures of huge government departments and their transforming shape over time. Yet though fluid, the ISAD(G) standard has limited possibilities for correspondence or creative linking, in other words, establishing relationships between different archives, and matching a detail in one with detail in another. While the field 3.5.3 'related units of description' can act as a link to associated records, the item, for example a document or a photograph in

its file, or the file itself, and the series in which it sits, and the collection group to which it belongs, remains largely as a self-contained whole. These relationships might be visualized as a tree with numerous main branches, off which smaller branches stem, eventually leading to clusters of foliage made of individual leaves, yet the tree stands separate from others, rather than within a forest, close to and intertwined with its neighbours. Thus, while an ISAD(G) record might sit alongside other archive descriptions, it does not really provide a means of extending beyond itself (in a more creative sense). Despite this, it is undoubtedly the best mechanism for explaining the arrangement of archives and adopting this standard drives a level of consistency at an international level.

At the Design Archives we describe each of our eighteen archives according to the ISAD(G) standard and we deliver these descriptions through the Archives Hub, an online portal to agglomerated archive descriptions relating to British university archives, and other archives outside the sector, numbering 180 institutions in total. As part of the Archives Hub, our multi-level descriptions of each archive unfold beautifully before our eyes replicating how the material was originally generated or collected. By clicking on 'full record', the top-level collection description can be seen to have several sub-sections or series that then, as one clicks on the folder icons, reveal further nested sub-sections, and each of these, further files within, that can be opened-up, right down to item level, i.e. we can see, for example, the place of the photo in the file alongside all its neighbours. Even more of a development is the way in which, during the past year, the Archives Hub has introduced the capacity to attach digital images to item-level records, so we can see the photo alongside the description of it. This means it is now possible to attach the Design Archives images produced for other digitization projects (by this time we had amassed a collection of over 6,000), to the correct place in the archival hierarchy, so viewers can see their proper arrangement. This re-attaching of the orphaned digital images to their archival context represented, certainly for the Design Archives, a dramatic alleviation of the symptoms of disassociated digital objects. Yet, this being the case, it raised another idea for it makes clear how the viewer cannot jump from the item level record to explore the greater context of what a particular photograph or document represents. We see the micro-geography of its archival arrangement (its local context as object) but however detailed the scope and content description, we cannot appreciate what this image represents in time and space, i.e. the macro-geography of what it represents, we cannot put it back in its place in the world.

In order to develop this idea, an example might help. In the archive there is file of photographs relating to each edition of the periodical 'Design'. The February 1966 issue of the magazine included a feature 'Eating Can be Fun' with some highly evocative colour images of the Golden Egg restaurant located in London's Leicester Square. In 2001 some of this photography was digitized and included in an online learning resource, one of seven published by the Design Archives as part of the project 'Designing Britain'. [Fig. 1] Authored by Matthew Partington, the photograph of the interior of the restaurant was included in a study of British crafts of this period, and the project placed this image in a new context, it had escaped, so to speak, from the box of 1966. How, now, might this action be developed beyond conventional research methodologies? Might there be a way to re-conjoin other digital objects relating to Leicester Square in 1966? Might there be a way to place this object alongside other represented moments, and see what else was happening at the same time, in the restaurant, or across the road, or elsewhere in London, and if we had a photograph of a visit to the restaurant, or a scan of a diary entry or of a receipt, could there be a way to bring these objects together? Could there be some type of digital environment, a matrix or mesh, which facilitated the space and time curation of digital objects? Might there be a way to create a more poetic navigation of digital objects beyond the frames of information management? Indeed, how could we use the indispensable organizational frame of ISADG as a jumping off point? While images or items accessible from a portal harvesting data from many collections might be

searched by time and place 'Leicester Square, 1966', it still would not be possible to perceive the spatial relationship between them. And it is the spatial that is, it seems to me, a critical element in how the past is perceived. Jorge Luis Borges, in 1941, wrote of time in a spatial sense and in a way that presages the potential of digital environments, 'That fabric of times that approach one another, fork, are snipped off, or are simply unknown for centuries, contain *all* possibilities.' Indeed, the theme of time and space is taken up in various places in his writing as a means of challenging perception, and it is this concept to which, I believe, Chris Wild is alluding when he describes his project, the Retroscope, as a 'perception'. And it is to this that we now turn.

By 2011, to recap, the Design Archives had created several thousand digital images from one of the largest libraries of industrial design photography in the world. Now, in the process of being added to their respective archive descriptions on the Archives Hub, the digital images are no longer disassociated from their context. But continuing to repurpose and re-arrange these images to enhance their research and learning potential remained an ongoing ambition. Early in 2010, a proposal entitled 'Design Mesh', with the aim to reconstruct electronically one of the pavilions of the 1951 Festival of Britain site as a frame for positioning digital archive objects, was discussed with the staff of the Visualisation Unit at King's College London. Though nothing more came of the idea as a collaboration with the Design Archives (the project was taken up by students later in the year) a colleague who learned of this proposal arranged a meeting with Chris Wild who was busy working on an idea called The Retroscope, a 'visual time machine' that intends to offer a way of surfing time online by integrating images, moving images and sound in chronological and spatial arrangements for people to explore, add to and curate.

The Retroscope is a development of the Retronaut website which since it was established in 2010 has had more than 1.4 million page views per month. While the Retronaut site delivers content (largely images and film) from one source at a time in a conventional editorial format, the aim of the Retroscope is to bring material from different archives together and to facilitate the potential coalescence of their holdings in a dynamic user-driven environment. The project has attracted the interest of many leading archives, including Getty's Hulton Archive, the Bridgeman Art Library, the Central Office of Information and the BBC. Attracting a great deal of attention, it was described by Ed Vaizey, Minister for Culture as 'the next big thing' and by John Mitchinson, Director of Research, QI as 'one of the richest uses yet for the web'. This was exactly the type of project that could move on how the digitized material from the Design Archives was searched, rendered and indeed, curated. Collaborating with the Retroscope suggested a way in which a University collection could work outside the educational sector to extend its visibility and currency and to make more porous the perceived boundaries between conventional educational environments and other, more public, less formal, venues for learning. Indeed, joining forces with The Retroscope would present a high profile opportunity for Design Archives resources to reach audiences unimaginable alone. We were curious about the advances in digital curation this might bring about, and the convergences between things that have led separate lives until now. What might this mean for arts education and research and for cross-sector dialogue? How could the placing of archival data in a shared spatial and chronological delivery environment (as opposed to the rigid conventions of archival hierarchies) inform new thinking in the arts and humanities? How might a collaboration of this kind provoke research challenges and opportunities? Already, as part of the JISC-funded Media Hub project we had started to add location data to our metadata and were interested in the possibilities of mapping and GPS technology. In 2010 we received funding from the Arts & Humanities Research Council for a doctoral project with the Chartered Society of Designers which centred on mapping membership data. What would happen, we wondered, with an information architecture, a tool such a Retroscope, that invited user participation in such a way that the unofficial would meet the unofficial. Here, it seemed, could be a project where none of the outcomes are prescribed, or could be predicted, where dormant

possibilities might emerge. Indeed, the National Archives in the UK, are busy considering the possibilities of mapping, or 'space exploration', among its suite of 'Labs' projects where various rendering options are being trialed. Will it be the case then, that the common elements of these systems, connected by their locational data, might one day converge, that the Retroscope could overlay the National Archives map, or the National Archives 'Digital Vaults' project in the United States, and that others could overlay these, and we could experience those multiple, forked stories, that excited Borges seventy years ago, that have inspired our sense of possibility, and which technology is now partly able to facilitate.

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THEORIZING NEW MEDIA IN A GLOBAL CONTEXT

SORAYA MURRAY

New media provides contexts for global-scale interaction, but theorization around new media rarely intersects with globalization discourses. In a field largely driven by technological innovation, critical theory may be seen as unproductive and thus extraneous. This paper examines the intersection of digital media's practice and criticality, moving away from theories of form and procedure, and situating its scholarship in a global ethical context.

Few contest the idea that advanced computational and communications technologies play a definitive role in today's global economic, social, cultural, political and even ecological orders. The evidence of this exists in technologies used to implement the internationalization of management, the globally shifting labor pools, the enabling of a cosmopolitan managerial elite, transnational banking and other such signs of economic globalization. It lives as well in social, political and cultural manifestations of globalization such as WikiLeaks and the social-media fueled Arab Spring.

While new media forms have a transnational impact, and profoundly influence globalization, one sees little critique or consciousness around issues of globalization as the context in which new media discourses take place. What is the disconnect between new media's global impact, and new media's discourses, which maintain little engagement with theorization of larger social and ethical concerns? In the context of rapid technological evolution, should the study of digital and electronic culture mirror ethical concerns, given the urgent social and political work that needs doing in the world? For example, universal rights discourses might be one key area where computational and communications technologies have contributed to major shifts by increasing the fluidity with which global subjects move across traditional nation-state borders, in keeping with shifting international demands for both the managerial class and labor. Considering the rights of diasporic, transnational and migrant subjects requires greater attention as their global numbers increase.

How can these and other issues of social uplift extend to an area that is fundamentally concerned with perpetual innovation, and often situated in a profit-oriented context? If we are to attempt an approach to electronic and communication technologies that contains within it a self-critical apparatus for contemplating the effects of those works we make and use, then what critical tools can we implement to greatest effect? Moreover, is the discourse of digital media the place to advance these and other theoretical concerns? I should make clear that I make this critique on the meta-level; it is not aimed at individual artists, many of whose works persistently address the important questions of their day. New media is not a unified discipline, but what one might more generally call an 'area' or 'movement' in scholarship, but it does possess a kind of centripetal pull of ideas that requires careful consideration 'as though it were' a discipline. This discussion is aimed at the level of discipline, and to safeguard the future relevance of what we as new media scholars do. Innovation and profit does not assure lasting significance, and in this regard our fledgling movement has serious problems.

This conglomeration we call "new media" is a truly interdisciplinary undertaking that has no fixed academic home, and by extension no organized intra-disciplinary self-regulating value system or ethics – in other words, no cohesive philosophical discourse. D.N. Rodowick's *Reading the Figural* [1] and Mark Hansen's *New Philosophy for New Media* [2] and the interventions collected in CTheory.net form three

examples of scholarly interventions into philosophical engagement with new media, but these are asymptomatic of the more dominant practice-oriented sector of new media scholarship.

In 2008, the worth of theory for digital media was explored in a public discussion between Ian Bogost and Jay David Bolter at the Georgia Institute of Technology. During this debate, entitled, "The Value of Theory in Digital Media Studies," both scholars pointed to the fundamental tension between what Bolter identified as the "procedural" side of digital media and the "culturalist" or critical theoretical side. Bolter asserted that critical theory is not designed to help make things; that it is not in effect "productive" in the sense of resulting in a product. Rather it is there to make an intervention in the form of critique. On this point there was no dissent from Bogost, who likewise indicated that, "theory's purpose is to change perspective, not create output." [3] And they were absolutely correct in this from the standpoint of measurable outcomes – the critique critical studies offers could be characterized as a drag on productivity, a kind of noise that disrupts the flow of creative efficiency. This is because its concerns are not with production, but with honing a set of critical tools that vigorously assess the products of a given society for their underlying meanings and ramifications. In its questioning and self-reflection, it can be seen to slow immediate results.

Bogost and Bolter debated how the procedural and critical culturalist aspects might better dovetail, a question that hounds combined theory-practice programs. Bogost suggested that the two elements mesh well in digital art production; others suggested this is demonstrated in design, or that it may be the role of scholarship to integrate the two. This seems to configure the coming together of theory and practice as the purview of artists and other 'creative' types, to relegate it to the aesthetic or the academic, as opposed to centralizing its importance for the procedural.

What is this apprehensiveness around theory? For me this question, with its attendant procedural / culturalist tension are connected to a larger contemporary crisis of higher education, particularly the conflict between the classical understanding of the university as cultivating intellectual acuity, versus the more neoliberal iteration of the university as training ground for capitalist enterprise. Writing on this crisis of academia, Gregory Jay characterized it as such:

[a] fundamental tension arises between the academic mission of preparing students to be critical citizens and neoliberalism's demand that they subordinate themselves to the dictates of the market. Obviously, neoliberalism has no need or desire for academic research that questions its operation, as such criticism creates 'inefficiency' in the market. [4]

Even the tools themselves beg not to be analyzed. The clean, abstract shapes of laptops and mobile devices, inscrutable and minimalist, disguise their histories and origins. This is often only ruptured by accident or technical glitch, for example in the famous so-called "iPhone girl" photos snapped of a young Asian factory-line worker that went out on the new device, discovered later to the delight of its owner. [5] That amusement is only possible because of the seemingly insurmountable distance between the phone's assembler and owner, which those images instantly broached. This factory image again masks another representation: that of the waste management and reclamation issues that plague mass production. On the back end of the technological cycle, is the ecological crisis of e-waste; armies of unfortunates must contend with the tidal wave of obsolescent technology, and run the gauntlet between spaces of production and capitalist excretion that mar the environment.

Indeed, there are many ways in which the theoretical contemplation seems not to mesh well with production. Setting these aside, I would argue that theory's presence in new media scholarship chafes at sensitivities that arise out of an overarching shortcoming in the area: we lack an ethos. That is to say, we may refer to ethics-based theory in our products, but that is very different from having an ethical grounding that guides, provides purpose and articulates a code for the movement. Theory provides the tools for ethical debate and self-critical reflection, and surely serves to articulate concerns that have ethical ramifications. Yet is often seen as an external punitive force, and hence side-stepped. However, rejecting the influence of theory as secondary to production does not displace the central importance of ethics. Ethics in the disciplinary methodologies of new media should and do precede theorization; ethics should act as agreed-upon fair and honest practices in advance of whatever our diverse disciplinary outcomes may be.

Technological development is ideologically configured as ultimately good, necessary and fundamental for progress; that the moral obligation to pursue innovation outweighs the ensuing sacrifice. It carries with it the promise of social betterment through technology, including but not limited to true democratic inclusion, a global web of consciousness and the outstripping of bodily limitations such as mortality. [6] However, there remains the matter of bodies, and how advanced technology imposes itself upon subjects in the world. An array of activist scholars have challenged the ethical neutrality in technology discourses and their visual cultures, including among others: Lisa Nakamura, María Fernández, Thuy Linh Tu, Wendy Hui Kyong Chun, Jennifer Gonzalez and Coco Fusco. "For all the celebration of mobility and fluidity," Fusco has written, "digital technology organizes a world economic order that thrives on a global labor pool of poor non-white people—for whom 'access' to many critical signifying practices—legal, symbolic, and electronic—is diminished and even denied." [7] Fusco along with many others argue for a more equitable set of relations between a global North and South, calling into question the duress of technological production on the bodies of disenfranchised laborers. These scholars are undertaking important work that deconstructs the present-day continuation of imperialist expansion and the rhetoric of technology as progress. They importantly tackle the issues of post-colonialism, hybridity, mobility, migration and Diaspora as they intersect with new media.

My inquiry here, however, is not a cultural studies-based critique of technology. Rather, in a larger sense we have to ask ourselves as members of a common set of interests: what is important about what we do? What is so consequential that intellectuals from other fields would look to our theorists to identify key ethical concerns related to technology in the world and, more importantly, derive useful reasoning that can have impactful resonance outside the hermeneutic specialty of new media? What is it that new media studies produces that is different from what Silicon Valley does? How can our field of collective interests have global relevance—or, lacking core values—even sustain itself? What do we hope to achieve if we do not have ethics?

Consider one lynchpin of internal ethical conflict at play in new media: the imperative to constantly innovate drives technology forward—and this drive is embodied both by those who undertake the challenge of developing new technologies, as well as those who intercede, such as hackers and other interventionists. Alexander Galloway describes this imperative as a part of a larger discussion on the political dimensions of network architecture. "Hackers," Galloway explains, "don't care about rules, feelings, or opinions. They care about what is true and what is possible. And in the logical world of computers, if it is possible then it is real. *Can* you break into a computer, not *should* you or is it *right* to...In fact, possibility often erases the unethical in the mind of the hacker." [8] Galloway refers to hackers and their relationship to code and specifically protocols, but the paradigm of "possibility eras[ing] the unethical" is quite

apropos to other areas of technological development, where the pursuit of innovation demarks a frontier to be discovered as an inevitable form of progress. Technological innovation races toward the promise of a horizon where the better, modern, efficient and more functional purportedly hold libratory potential for culture. As a result, technological industry seems to function largely autonomously from a self-critical apparatus beyond that demanded by capitalism, to guide its aims. Hackers react to institutional systems, certainly tangle with the machine, and are ideologically configured as having an antagonistic relationship with capitalism. But as Galloway points out, this is separate from having an ethical framework to guide them. And in the end, their efforts may ultimately and inadvertently contribute to the strengthening of the controlling logics of protocols, by pointing out the loopholes and backdoors that are eventually sealed. Certainly, Galloway's perspective generalizes; still, it illustrates its point well. It is this question of the ethical (as opposed to merely the possible) that requires a critical foundation, one built from sound theoretical building blocks.

I have here characterized a series of challenges, each nested inside the next: new media exists within a context of globalization, while its theorization seems not to acknowledge major ethical concerns of that context. Meanwhile new media studies is currently driven by its procedural side, while its diminished critical culturalist side seems to contradict the logic of production. However, without critical examination and contextualization, much of what new media does is indiscernible from research and development – a compromised position in the face of the tech industry and its resources. When subject to the accelerated expectations of technological innovation, such production can only temporarily impress audiences, before facing the certain doom of obsolescence. Armed with an ethics and a set of critical tools with which to self-evaluate, new media scholars and producers social actors with agency to affect global outcomes, and whose cultural context is inextricable from their innovation.

One need make no argument about the connectedness between cultural context and the tools that form the object of study for new media scholarship. Noted sociologist and scholar of globalization Saskia Sassen, in example, contests the dominant understanding of the relationship between digital and non-digital spaces. Sassen argues that the dematerialization associated with digital media is largely myth, and in fact the goings on of the datasphere are deeply bound to the material world.

The digital is imbedded in the larger societal, cultural, subjective, economic, and imaginary structurations of lived experience and the systems within which we exist and operate. At the same time, through this embeddedness, the digital can act back on the social so that its specific capabilities can engender new concepts of the social and of the possible. [9]

The feedback loops that she describes between the digital, the non-digital, the social and the possible evidences an interplay that is mutually influential; it potentially opens up new and fertile territories for conceptualizing our sphere of activity not as hermetic but rather engaged with context and subjectivity.

This is one of innumerable possible perspectives, the lenses for which already exist in the array of disciplinary approaches associated with critical studies such as sociology, philosophy, political science and media studies. Seyla Benhabib, a venerated political theorist, utilizes liberal democratic philosophy to reason through the ethical challenges heightened by globalization. Benhabib emphasizes moving from the rights of citizens as defined by national identities and borders, to universal human rights, which acknowledges the increasingly porous nature of borders as a result of global flows of capital, products and bodies. [10] Manuel Castells, arguably one of the most important living sociologists studying the impacts of globalization and advanced communications technologies, has recently published *Communication Power*, which ambitiously undertakes to characterize sweeping impacts of both online social media and

traditional mass media—what he calls "mass self-communication" and its reshaping of global power. [11] Clearly discourse of advanced technology is inextricable from ethical conversation. Technology implements ethics, whether or not its makers self-consciously select or even recognize their ethical positioning. In fact, I would go so far as to say that forms of technology are ethical philosophy in practice. Hence, it is imperative to bring sophisticated language and critical frameworks that enable ethical conversation to take place, within discussions of new media.

As a relatively young area of interest, new media studies need only look to another recent disciplinary struggle, namely that between art history and visual studies, for a cautionary and instructive example. Mieke Bal, a noted cultural critic and theorist, has written of art history and its notorious lack of "methodological self-reflection," which led to a profound crisis around its object of study, and the subsequent formation of alternative approaches to visual and material culture. [12] The emergent scholarly discipline, visual culture studies, promoted analysis that brought rigorous self-criticality to the table. This radically reconfigured the objective of study not in terms of a pedigreed object, but always with a skeptical relationship to the object in its various webs of relation. Meaning, then, does not issue only from the form in itself but also context—and the analytical tools possess a kind of 'self-sharpening' feature. In time, the academy has seen the melding of art history with visual studies; many departments now bear both names and support both approaches as a means of ensuring the contemporary relevance of art history, while grounding visual culture in the object to some degree.

How can we, by developing a problematized relationship to our own material, continue to evolve what we do as new media experts? Now that we are finally moving beyond defining what new media is or isn't we are free to move on to possible tasks such as probing technological essentialism in its many forms, unveiling the workings and political urgencies of advanced technology in context, and advancing a commitment to new internationalism as constitutive of technological experience.

I would like to return once more to the conflicts of the "procedural" versus the "critical cultural"—a dualism that falsely divides the intellectual labor around technology, and that needles the anxieties of both theorists and technologists, particularly those occupying the academy. Theorists are anxious that they aren't understood to be 'making' anything, that they aren't productive, per se, and more likely slow the process of production. Further, in the cases where theorists are not also 'makers,' their contribution may be diminished as navel-gazing and interloping into a conversation occurring between producers. However, contrary to the idea that critical theory produces nothing, the intellectual discernment and criticality developed from training in critical methods is measurable as well, however along much longer timeframes and long-tail effects. The rigor of the resistance criticality provides refines the procedural dimension, but also introduces theoretical and ethical self-regulation to its operations. One senses, in kind, the angst of technological producers who are constantly anxious that they don't make anything important or lasting. Innovation is always overtaken by the subsequent innovation, seemingly without end. The solution to this quandary lies in the development and valuing of a theoretical feedback loop regulated by an ethical framework that takes into account the context and players through which technological progress is made possible, and through which it enacts itself. This should be a rigorous, systemic part of the scholarship that influences the outcomes of production. The digital media we use are not neutral tools, but enact social, ethical and moral worldviews. Theorists and producers needn't worry: the work we do is relevant; but before we study digital materiality, presentation, aesthetics or evolution, before we theorize the algorithmic or the informational, we need core ethics. For a disciplinary sense of self-assuredness that can enable digital media theory and production to do good work in intellectual culture and in the world, it requires a strong ethical philosophy.

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HUGGABLE NATURE WORKSHOP

Hye Yeon Nam

Huggable Nature is a public workshop in which participants create wearable interfaces using simple arts and crafts materials to express playful affection towards nature. Specifically, participants design and construct tangible interfaces, which enable them to leave voice messages that play back when they hug trees wrapped with fabric interfaces.

Motivation and Background

MOTIVATION

In the past, when various workshops entailing mechanical electronic parts, including software and hardware, were introduced, organizers often encountered difficulties. For example, at times, their participants felt that they needed to have an equivalent knowledge of computer science or electronic engineering prior to attending the workshop. [6] Simple micro-controllers such as Arduino and Lilypad facilitate participants' engagement with interaction design. [7] However, with such platforms, users still need to have a basic knowledge of programming.

The *Huggable Nature* workshop is intended to provide participants with playful interactions with nature. Because *Huggable Nature* entails the use of simple arts and crafts, with which most participants can use easily and quickly to create interfaces, it is designed for general audience. *Huggable Nature* is a forum for providing playful experiences and for examining participants interacting with nature rather than producing refined results.

BACKGROUND

Do-it-yourself (DIY) practices have been explored in several fields such as sustainable design, fine arts, politics, and health. [1] The general definition of DIY in design and arts is making a product one-self. Broadly, when people create, fix, reuse, and assemble materials, we call it DIY. Popular culture has reflected these movements in TV series and magazines. However, recently, the meaning of DIY has often been used for sharing information, following printed instructions, and collaborating actively. It includes not only the final outputs but also the experience of sharing knowledge and techniques with others. [7] Through DIY, activities become more like playful leisure. People become more engaged and creative when they are enjoying themselves. Such an enjoyable environment is embodied in *Huggable Nature*.

- Popular Culture

The British television series *Barry Bucknell's Do It Yourself* and *Bucknell's House* in the 1950s and 1960s and American action adventure television episodes such as *MacGyver* (1985) and *The A-Team* (1983-1987) played an important role in the popularization of DIY activities. [6] Fan magazines (fanzines) are

also DIY activities, but ones that actively build underground communication channels related to music and sports. [10] A number of fanzines were generated during the first wave of the punk movement in the United Kingdom (1976-1979). Psychiatrist Frederic Wertham has described fanzines as “a special form of communication” in *The World of Fanzines* (1997), and the American writer and academic Stephen Duncombe has characterized fanzines as small publications in which producers create their own unique culture. [2] As independent, self-published publications, fanzines build identities of freedom and resistance in their contents and graphics influenced by the self-empowerment aspect of DIY activities.

- Do-It-Yourself practices

Traditionally, *leisure* has meant the opposite of *labor*. Leisure is regulated by the individuals themselves, whereas labor is structured by other supervisors. British neo-Marxist scholar Edward P. Thompson describes how people’s understanding of leisure time changed as a result of industrialization in the late eighteenth-century. He states that “In all these ways - by the division of labor; the supervision of labor; fines; bells and clocks; money incentives; preachings and schoolings; the suppression of fairs and sports - new labor habits were formed, and a new time discipline established (p.394).” [9] American author Steve Gelber points to the value of DIY activities as hobbies or creative endeavors, noting that “the ideology of the workplace infiltrated the home in the form of productive leisure (p.2).” [4] In this context, he claims that labor could be viewed as leisure. Creative DIY activities bring all the qualities of leisure to labor. Participants in *Huggable Nature* do creative activities individually, share opinions with each other and design arts and crafts to express their affection towards nature. In these activities, they are self-motivated; they do not experience it as labor, but as leisure.

- Playful Interaction

Interaction designer Bill Gaver states in his essay “Designing for Homo Ludens” that “play is not just mindless entertainment, but an essential way of engaging with and learning about our world and ourselves.” [3] He emphasizes the importance and the power of engaging in and learning from play that accompanies intrigue and delight at all ages. For example, in one of the *Huggable Nature* workshops in an Istanbul high school, a senior high school student designed interactive lingerie for hugging trees, thoroughly enjoying the process of creative design. Sometimes she shouted or giggled with her friends while she created and interacted with her devices. In another *Huggable Nature* workshop in the Atlanta Mini Maker Fair, a five-year old boy participated. As he was too young to sew fabrics, he painted conductive inks onto pre-cut wearable devices. After he finished his paintings and left voice messages on the trees, he was excited that his voice messages played from the trees. He commented, “The tree is talking to me.” He seemed to treat the trees as conscious beings. Because the *Huggable Nature* workshops are based on creative ideas and physical activities applicable with all ages or interests, participants are excited about expressing themselves, connecting with nature, and interacting with one another.

Workshop Principles

The *Huggable Nature* workshop is designed to accommodate participants with different abilities and skill levels. The beginning of the workshop leaves time for the exchange of opinions among participants. Then, participants rapidly and easily create playful devices that interact with trees using arts and crafts within a limited time frame. The workshop follows two general principles:

- Openness and collective ideas

People sometimes take nature for granted. In the *Huggable Nature* workshop, participants look for ways to appreciate nature. For example, participants often say that they have never communicated their affection and appreciation to trees before *Huggable Nature*. Also, when they discuss their experience with nature in the workshop, they exchange their ideas and improve their designs. With the success of open software such as *Processing* or *Openframeworks* and web participatory models such as Wikipedia or YouTube in Web 2.0, [8] we can see the evolution of “shareability” and the power of openness in other media. The concept of shareability is similar to Henry Jenkins’ “collective intelligence” or the ability to pool knowledge and compare notes with others toward a common goal. [5] The *Huggable Nature* workshop reflects the concepts of shareability and collective intelligence through active discussion and collaboration, both of which create synergy. As the workshop progresses, unrefined ideas are articulated and implemented into concrete outcomes. Since the *Huggable Nature* workshop is held outside in a park or community garden, more people participate in discussing ideas and creating wearable devices to interact with nature.

- Simple processes and immediate feedback

The *Huggable Nature* workshop focuses on enjoyable and creative designs that are interactive with nature. Simple crafts and DIY practices allow participants to concentrate on their prototypes and minimize the fear of and the need to learn extra technologies. When participants see immediate results, they maintain their interest. In the workshop, they use conductive threads, yarns, fabric or ink to create wearable devices. While touching and hugging trees with their own devices, they close electronic circuits. When the circuits close, participants immediately hear their own or previous participants’ recorded voice.

Workshop Structure

The *Huggable Nature* workshop has been developed over the past two years and presented in three different countries. *Huggable Nature* consists of four steps: set-up, discussion, design, and interaction.

SET-UP

Before the workshop, organizers wrap fabric interfaces around trees. The wrapped felt fabric contains micro-controllers, sound recorders, and speakers. Some interfaces are decorated with words such as “I Love you” or “Hug Me” or with figures of smiling or whispering human faces (Fig 1).

DISCUSSION

In the beginning of the workshop, participants talk about their interactions with nature in their daily life and discuss how they make their surrounding environment happier.

DESIGN

Participants create devices crafted from art materials that they can wear to touch or hug the fabric on the trees while expressing their affection. Some make bracelets or gloves, and others create t-shirts or masks.

INTERACTION

The participants leave voice messages on a recorder attached to the fabric. Then they put on their own designs to touch or hug trees to listen to their own or other participants' messages.

Workshop Results

The *Huggable Nature* workshop has been held in four places: Washington Square Park in New York City on October 9, 2010, as part of the Conflux Festival, the Sao Paulo Cultural Center in Brazil on July 19 and 20, 2011 as part of FILE (Electronic Language International) festival, at the Georgia Institute of Technology in Atlanta on September 10, 2011, as part of the Atlanta Mini Maker Fair, and at an Istanbul high school in Turkey on September 12, 2011 as part of the ISEA (International Symposium on Electronic Art) conference. The first and the third workshops lasted about three to five hours and were attended by about 30 people, including families and local community members, all of whom spontaneously participated in the workshop. The second and the fourth workshop were spread over five hours in one or two days and were attended by around 10 people. All the participants were pre-registered. The following section contains a selection of workshop results:

INTERACTIVE BRA

In the Istanbul workshop, a senior high school student designed an interactive bra for hugging trees. It had two fabric pieces connected with two strings. One was tied in the middle of the back and the other tied behind the neck like a swimsuit. She designed heart shaped conductive fabric and attached it to the printed fabric. After she finished her interactive bra, she recorded her voice messages to the trees. Then she put on her conductive bra. When she hugged the tree, the conductive fabric closed the circuit in the interfaces wrapped in the trees to play her voice messages.

INTERACTIVE GLOVES AND MITTENS

Participants created various gloves and mittens in the workshop since most participants touch the trees with their hands. Some made mittens to avoid sewing a space for each fingers, while some fashion major participants decorated their gloves with letters from "LOVE" or added complicated designs or fasteners (Fig 2).

INTERACTIVE BRACELETS

When participants made interactive bracelets, they needed only rectangle shaped fabric and Velcro tape. Since this is the easiest way to contact trees, young children who are too young to sew fabric as well as adults who do not want to sew paint conductive inks on the pre-cut bracelets (Fig 3).

After they made their designs, they recorded messages, including "Hello trees, I love you and I love hugs," or "You are the earth and so am I." Then, they put on their own designs. When they hugged or touched the trees with their designs, they heard their recorded voice. Some of them became excited

and shouted. Other participants giggled. Many of them urged their friends to participate. After their interactions, the participants gave feedback about their experience. Most said they felt closer to the trees or at least had a positive experience.

Conclusion

The goal of *Huggable Nature* is to have participants reflect on their feelings about nature. By including easy to use arts and crafts materials and techniques, participants can comfortably get involved in the workshop. Whereas many other similar workshops focus on groups of people with similar abilities, the *Huggable Nature* workshop is open to all individuals regardless of their experience, age, income, or technical skill. Currently, participants can only interact with trees in limited interactions. In future workshops, we will add other objects in nature and other modes of interaction.

Acknowledgments

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AN AMORPHOUS IMAGE PROCESS

Kevin Sarmiento Navarro

This creative and constructive process is based on a different approach toward thinking, in admitting if the image to build expects to determine what reality is and what amorphous reality is, or to produce a series of “images” with a correlation into an amorphous concept.



Fig 1. The Saltropomorphous



Fig 2. Night morphous



Fig 3. Image Transformophous

“The Saltropomorphous” (The jump of an amorphous landscape), is the imaginative idea of a sub real abstraction of a linear moment of form, colour and volume; Beginning from the concept of an isolated landscape inside of a real or imaginary boundary of “amorphous space” that because of being in the light, generate a shadow or “mirror image” with opposite properties. Two ways to allow each an intermediate step to be an equilibrium state, and produce in a sense the “jump” of the amorphous body into its own unchangeable notions of time and space(s).

AN AMORPHOUS IMAGE PROCESS

This creative and constructive process is based on a different approach toward thinking, in admitting if the image to build expects to determine what reality is and what amorphous reality is, or to produce a series of “images” with a correlation into an amorphous concept. The possibilities are endless, because amorphous thinking in visual terms is an inextricably bound up with sensation and perception. In many ways, how we think is how we see and vice versa. The same mechanisms operated on both the perceptual and the intellectual level, so, these inevitably terms like concept, judgement and conclusion, have to be applied to the work of senses on the use of a method for an amorphous image creation.

Process art attitude may be direct as far as possible toward the perception of “image as such” and closer as possible toward a perception of “amorphous”, to visualize a conception of boundary and form, a brewing scenario for an intuitive vision of an amorphous space, a lapse of time of constant flux where energy and information coming into existence, light and shadow, harmony, a form of animism, the unpredictable on the observer visual sense, the emptiness of absolute identity, an 'inherent existence' – perceived and thought to exist 'from their own side' exactly as it appear.

In the process of creating, the image environment has the constructive idea of “amorphous space”, to create the capacity of finding different approaches, generating themes around space and time, thus springing the changes where the image shape is subdued by the external elements that make it.

Amorphous *thinking* in the form of amorphous images, will transform those amorphous spaces resembling a boundary that never exists inside of it; observer only will see a bit of an image that cause his senses to produce images that make visualize amorphous image shapes.

If the process undergoes a cycle, whether it becomes a larger space, or smaller, then it will have the same amount of image space each time it returns to a particular point. Nevertheless, the open flow of image event is another transfer mechanism, a quantity of image which is independent of any particular process.

For an amorphous image with a few space, the variations in the image parameters become larger than the image processed, and the assumptions of an image process is meaningless. It is an expression of the fact that over time differences in an image process, its place, and results tend to even out an image process which is isolated from the observer.

Therefore, An Amorphous Image Process has its own laws of construction, with problems representing the process of amorphous thinking in visual terms. Though, instead of being formulated the medium of image language, is embodied in visual terms the medium image and process form elaborated, a visual reasoning or visual language, an inquiry based on the constructive and creative process, the cognitive knowledge, instinct and intuition, to encourage and to explore the speculative and the experimental nature into the notions of image place, image space and image event.

AMORPHOUS IMAGE SPACE-RELATED EFFECT

When two amorphous images are in visual contact with each other, there will be a shapely between these unless or until this are in equilibrium. It is not a good idea to create an amorphous image space without any mirror image support. This is a conservation of an image connection. It may refer to the two ways that a closed space transferring to and from its surroundings, by the process of intuiting (or constructing) an amorphous space. The real or imaginary boundary in an amorphous space of an image shape is determined by the image event of these two processes. The amount of an image place in a constant process cannot be greater than the space showed.

Seeing moving space as an image event, if a space moves in a forward direction and one, as a moving image on space, observer will never see the image reform. Images are “jumping” all the time, but never reforming. Therefore, the constant of any unique image place stage is zero. If an amorphous image process happens to have half-image face about quickly, there are two images stages, related by an image-reversal-symmetry, so the dimensionless image constant becomes the record of two images. That is the image for the whole space on any amorphous image. Basically, an amorphous image can not reach an absolute zero space.

Accordingly, images with large associated forms take long time to visualize. For an image of any complexity some of the realization in the amorphous image process could be a two-view image system. The image *viewed* through a first space, to excess image elimination, generating a mirror image which is

stored in a shape. The second process sorts the mirror image, which is then shaped in a quicker image to be visualized.

This alternative approach is to use a concise image form together with indirection spaces. This will reduce shape requirements and performance time. It is convenient to re-use a constant image space form used as in excess of space elimination. The previous space is reduce and convenient. There are two new images and deleting the excess of shape will keep a constant image space form programmed associate for a faster generated image.

In the development of an amorphous image process there is a similarity to the development of feeling from reason, of emotion from language. Emotion = image; language = process. Image shape comes about as the result in return action of two or more intellectual emotions; an amorphous image process occurs from the image impinged of two or more image processes.

Consequently, an amorphous image space represent the possibility of expressing a new image world, because it offer a brewing scenario of an intuitive vision, and during the lapse of the image process, it transform artistic intuitions without having to change images, only transforming it for the benefit of harmony.

Meanwhile most people cannot discover what matter about an amorphous image process and its space-related effect; I can consider what matter about it, as an original and authentic question for a research and experimentation on images transformation.

IMAGE TRANSFORMORPHOUS

An amorphous image process as the begins of an endless line of continuous transformation of an image place, a mirror image space for everyone image event, continuing without stopping, or being interrupted in space or time

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Image Theory

DIGITAL TECHNOLOGY, SOCIAL MEDIA AND EMERGING TRENDS IN FILM PRODUCTION METHODOLOGIES

JODI NELSON

I am interested primarily in how the new paradigm shifts in digital technology and the democratization of the filmmaking process allow filmmakers to connect to an 'expert' global niche audience with more immediacy through the internet, engaging virtual communities, crowd funding and fan building initiatives and a variety of social media landscapes.

DIGITAL TECHNOLOGY, SOCIAL MEDIA AND EMERGING TRENDS IN FILM PRODUCTION METHODOLOGIES

With the new paradigm shifts in the film industry, cheap digital technology and the democratization of the filmmaking process, filmmakers now can connect to an 'expert' global, niche audience with more immediacy through the internet; engaging virtual communities, utilizing crowd funding support and fan-building initiatives through a variety of social media landscapes.

NEW PRACTICE METHODOLOGIES

My own work has revolved around two kinds of practice; the first, a traditional methodology invented by the Hollywood studios, which, from a small independent filmmaker stand point proved futile at best. With little to no resources to pull off a production like the big studios do, with their huge studio budgets, political backing, global media support and accounting practices, today it seems a waste to pursue an independent film production in this manner. The second practice is participatory filmmaking. This method enables others to articulate their experiences through my artistic vision via cheap digital technology and social media. It is through this process, they have just as much (or little) control as possible as the filmmaker. But, why you ask would filmmakers want that?

"What defines the documentary genre is also at the root of its limitations...here, I shall call for a different perspective on documentary form: not with a view to discussing what documentary is, but to make some suggestions of what it could be." (Knudsen, p. 109)

In creating the participatory film project and case study entitled: *Single Girl in a Virtual World: What Does a 21st Century Feminist Look Like* my practice aims to engage multiple social media communities such as; Facebook, Twitter, MySpace, Wordpress, YouTube, Kickstarter and IndieGoGo and ask people to participate in the film project itself with a sense of creative input. During the production, I have asked the communities to read the film site's blog, watch podcasts, comment on news feeds and follow me on Twitter. These efforts are the practicalities necessary for audiences to participate in the film project itself – either creatively, financially or both.

The project's content has begun to emerge and appears in its raw shape as a video diary of sorts, with participants weighing in on the topic of the week, freely giving their insights, thoughts and feedback through the multiple social networks – either in video, textual or both. For the filmmaker, this serves as a rich valley of resources that can be integrated in the film's narrative. However, when attempting to construct a narrative thread by gathering content in this way, it brings up many potential problems. "Recording a video diary, if you don't want it to become public, is a risk; perhaps more so than a written diary, because the medium of video implies a mass audience." (Rothwell, p. 154)

One of the exciting things about these new possibilities for filmmakers and audiences alike, despite the potential ethical pitfalls, is the creative flow of information, access to resources and sharing of content. Independent filmmakers who are limited on budget, time and production technologies can gain a tremendous amount of quality production value by sourcing content in this way.

Whichever way they came into the community, the goal is to keep them there, involve them in the production efforts and keep them just as excited as you are about the project. And to do that, there must be a transparency between the creator and the fan-base participating in the project itself. This covers a multitude of scenarios such as; copyright issues, ethical boundaries, life-rights, video-audio rights and original content ownership. By simply asking for their permission seems to be fair enough for their participation. "Key to the success of that relationship is that it demands a responsibility for the consequences of the filmmaking that go beyond the film itself." (Rothwell, p. 155)

When I started this case study, I had an overall fear of intellectual property thievery; which stemmed from my traditional, Hollywood studio practice experience. "Rather than oppose this 'illegal activity,' we welcomed the pirating and began distribution directly to the pirates at production cost value." (Blagrove, Jr., p. 176) Delightfully, once I began my practice in this participatory way, I could begin to see it actually had many benefits of being 'stolen' and shared virally. The more I blogged and podcasted calls-to-action the more activity my social networks would see, more members would sign up for my news feed, follow me on Twitter, 'Like' me on the *Facebook* page, and read my *Wordpress* blog. Then of course, the whole idea of this process was once they were fans within my social networks, they would participate and share content I could then use freely in my film.

VIRTUAL AUDIENCES

"The on-going conversation with your audience can be a source of inspiration, motivation and ideas. It's this powerful new link with the audience that the old power players don't understand." (Kirsner, p.4) I can no longer imagine going back to a traditional filmmaking practice hoping to make a modest living, or even attempt to have a sustainable career by playing by the old rules of the studio production and delivery system. The windows of financing and distribution are just too complex, too expensive and too long of a cycle to have any hope of quick returns on investments or to gain access to huge marketing budgets for global exposure of film product.

"By empowering ordinary people to speak as experts, they question the basic assumption of dominant ideology, that only those already in power, those who have a stake in defending the status quo, are entitled to speak as if they know something" (Juhasz, p.304). It is with this notion that is measuring how social media, digital technology, alternative production methodologies and various new delivery strategies

are providing information on the impact of the film's message and its creative process. Does this mean the film is suitable for a theatrical release?

My practice is showing that audience participation does, in fact, impact both the audience and the filmmaker inherently by creating art in this way. Instead of outsourcing functionalities to other resources in a traditional sense, I had to become an all-encompassing expert. But, one now asks the question - who is in control? Who is the 'auteur' with the vision? What happens if the film's narrative thread goes off-track? Who are the performers and what ethical considerations are at stake?

How can I draw an audience into the reality of the situations being dramatized, "to *authenticate the fictionalization*?" ...what are we to make of films where real people apparently 'play themselves' (or variations on themselves), or hybrids where a combination of actors and non-actors improvise in a documentary-like scenario?" (Ward, pg. 192) It is the originator's role to ensure that the participatory environment also abides by the community rules of transparency, honesty and attributes of authentic form. "Notions of performance in documentary are therefore potentially controversial – accusations of people 'not being themselves' or 'playacting' are rife, and are deemed to be a central problematic for a film's documentary status or credentials." (Ward, p. 192) Otherwise, not seeing these participants in person; looking them in the eye – how is the filmmaker to know what is factual or fictitious?

A greater embrace of innovation and experimentation in this method is needed in leveraging these projects with the ability to fail without showing loss of value. Technological knowledge and new creative approaches to build communities and better business models that filmmakers and artists alike are needed. It is possible to achieve a quality film production with inherent.

By engaging in filmmaking practices in these fundamental ways, a shift of power away from the larger powers of the studios, and back into the hands of the creative filmmakers and their loyal fans should be embraced, not feared. "The question for makers, consumers and scholars of moving images are what distinguishes documentary online from documentary made for other channels, and whether the internet has any distinct, useful or unique characteristics that offer documentary anything more than just another means of distribution." (Birchall, p. 279) A process of creative flow, execution and community outreach is a necessary part of this practice and to maintain a sense of shared community.

TECHNOLOGICAL SHIFT

A profound new shift in mindset was needed to set off on a new course of practice; even though outcomes are uncertain. "First, in organizing geographically diverse individuals around a common interest in watching or making documentaries, there are new forms of community; second, new means of creation and distribution...to seek to change people's minds or reinforce a viewpoint; third, we have increased access to 'dirty reality' in the form of footage of current events and violent conflict; and fourth, video diaries and other moving images give us an increased range of intimate access to the lives of other people." (Birchall, pg. 179) Differences in workflow patterns, a means of gathering content, and a creative approach within high production value considerations, compromises and technical limitations stretch limits on what is possible.

Thousands of entries, news feed comments, tweets, sharing of videos and user-generated content (UGC) from YouTube and other rich video sites by community members fill the coffers of content. Skype interviews became a relevant resource of production activity for capturing remote interviews, even though the media is still not high value. During this process, I discovered because I was developing a rich social network, people I knew in my personal social circles; friends, family, co-workers, business associates, etc. suddenly became keenly aware of the project I was making and were eager, or at least willing when pressed, to participate in the project.

User generated content (UGC) has been the most pervasive amount of content, shared and streamed by my community members so others can comment, share and watch within the framework of the film's websites. "By contrast, the easy availability of material to work with online is matched by the ease of remixing and redistributing." (Birchall, p. 280) This aids the independent filmmaker who need open-source, archival clips in order to create a film narrative. There are ethical and intellectual rights considerations, however that must be mentioned.

It is also important to note, because technology is cheap, social media pervasive and artistic democracy entering the creative fold, doesn't mean the value of the art or the filmmaker behind its creation should be valued any less. "People made information about themselves available on the internet in such a way that theoretically anyone could see it, but in practice few did." (Birchall, p. 281) The reality of the new entrepreneurial filmmaker is not only making just a film project, but rather building a community of like-minded people who want to support a film project and future projects – in essence building a sustainable brand. This takes an inordinate amount of time, effort, management and technical troubleshooting. Not to mention, technological requirements, necessary to connect all of these networks in a functional and significant way - once they are functional and put in motion, should self-perpetuate. This is an ongoing resource of time and labor that must be considered.

The benefits in making art in this way far exceed the amount of time and effort it takes to build an online brand and identity. Other filmmakers too, are building sites with the intention of creating a sustainable business model, as well as attracting a built-in fan base that can't be bought with traditional advertising and press campaigns by the larger studios. The case study of *Four-Eyed Monsters* by Arin Crumley was a forerunner for this social media movement. Films are now being made everywhere and there are audiences out there who are looking for them. Audiences, however, are fickle, but entrepreneurial filmmakers have a distinct advantage over the big studios by creating art that is meaningful and creatively autonomous, while building a loyal fan base, which will enable the artist to self-sustain.

PARTICIPATION

Does the 'audience' participating in the early stages of a creation raise expectations for the audience? What about for the filmmaker? Does it impact the artist's methodology of creation itself?

Participation between audience and filmmaker enables each to develop a relationship that goes deeper than merely one from a consumer or isolated artist's point of view. It becomes a two-way process; although being auteur and the creator of the project, driving the subject matter, its pacing and narrative criteria, provided an overall control and direction for the project. It is important to note, that

its subject or method itself wasn't diminished in value, nor did it have the perception of being an amateur product. In fact, it's been the opposite, which emphasized stronger value for both the filmmaker and the project being created with the audience. The process has allowed a more authentic, accessible and transparent relationship to develop amongst the community, which makes the film's subject, and experience, more tangible. Having the film aimed specifically towards a key, niche audience, seems to make them keen to be involved and stay invested for future projects. It is the script or narrative and production value which must be the best possible so there is a perception of professionalism throughout the production.

The community does, in fact, communicate amongst themselves and will certainly 'police' any activity that does not acquiesce within the group. This 'policing' by the community assures transparency, trust, authenticity and protection against spam and unwanted advantages a filmmaker or other community member may seek to squeeze information and/or money out of its community for personal gain. "The immediacy of new online forms should not be mistaken for a lack of mediation...authenticity is highly prized by audiences." (Birchall p. 282-283)

There are certain sacrifices that must be made outside of the normal filmmaking agenda; such as engagement in crowd sourcing campaigns, new technological learning curves and social media training, traditionally hired out (i.e. media partners, technology programmers, sales/fulfilment houses, marketing firms) must be learned. There are many perceived benefits, as well as challenges in this new era of digital technology and social marketing tools that are advantageous for both the filmmaker and their audiences.

Measurable changes in production practices must also be adhered to by utilizing these online tools and cheaper production technology. How does this change the storytelling process?

Technological considerations must be made for the lack of financing and a large crew. The entrepreneurial filmmaker is now essentially a 'one person crew' where every single shot, direction, post-production/ editing, writing, producing, marketing and digital online development and management can be achieved with the sole artist. Aesthetic compromises are also at stake. However, it is worth noting that with small cinema, mobile and online video distribution choices that are growing every day, there are many outlets of distribution that do not require a 35mm or HD production aesthetic to tell a story. Ultimately, the script is still at the heart of every film – it is only the methodology and system of delivery that has changed. "The film business remains a single product industry. The product may be available on many different platforms, but it is still the same thing." (Hope, 2010)

With the attraction of crowd funding sites such as, Kickstarter and IndieGogo, financial resources are now available for filmmakers, who don't have access to rich uncles, mix with the Hollywood investor crowd, or can fund their projects across a mass of credit cards. "Expectations have changed considerably, probably completely. Buyers and audiences behaviors are different, those that still remain that is. Products are valued at different levels. We live in a new world. Our strategies must change with it." (Hope, 2010) The production and fundraising of a film in this style is beginning to produce a more valuable, sustainable, niche-market product and is changing the traditional market structure of distribution and delivery for independent filmmakers outside of the Hollywood system. It is also providing a platform for artists in countries without the support of film communities, government subsidies or fundraising activities. This enables a global access to films and stories that might otherwise never be told. "On the face of it, *Kickstarter* is pretty harmless, and I think the founder's intentions are good. It's great that people can raise money for cool things from the crowd. It's hard to raise money, especially for the arts, and

there have always been a lot of gatekeepers in the way. Now, the people can decide what gets funded.” (Newman, 2011)

Still, further questions for scholarly and industry debate continues. Will it be profitable? How can a filmmaker, who makes a film online for free ever hope to see a profit, much less sustainability? For Hollywood, what affects the bottom-line ultimately, is the question they [studios] are waiting to see emerge profitable.

CONCLUSION

If it is profitable, how will this change the open democracy of the ‘wild west’ we see now in this new trend? Will it continue to be available and ‘free’ to all or be monopolised, packaged and sold as IPO to the highest bidder forcing filmmakers to go through yet another middleman to make their films? Will these online, participatory, transmedia interactions incentivize the audience to buy the finished product and any subsequent ancillary products associated with the creative product? What about future projects the filmmaker produces? Can there be added sustainability in this model? These questions and more that arise through research and practice will continue to merit further question and research. With arts funding continuing to dwindle, such as the reduction in grants and lottery funding, filmmakers have turned to crowd funding to finance their livelihoods – but will the audiences enable that to become a reality, or will the studio systems in place prevail?

“Creators, Distributors, and Marketers have accepted a dividing line between art and commerce, between content and marketing. By not engaging the filmmakers in how to use marketing tools within their narrative and how to bring narrative techniques to the marketing, we diminish the discovery and promotional potential of each film.” (Hope, 2011) On a larger scale, projects in this realm will emerge answering the question of how this new methodology of filmmaking relates to a wider economic, cultural, environmental and social scale.

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AESTHETICS OF VOICE

Norie Neumark

This paper introduces key themes in relation to vocal aesthetics: voice as intersubjective, paradoxical, uncanny, intimate. It asks how voice is determined by and determining of spatial relationships and the way this affects memory and place. The paper explores specific examples from media arts to explore the performativity of voice and an 'authenticity effect' of media voices.

A number of key themes reverberate through the aesthetics of voice: paradox, uncanniness, intimacy, intersubjectivity, performativity, and memory and place. I'll begin with a brief introduction to these themes, turn next to modalities and techniques of voice in media art, and finally end with a discussion of voice's 'authenticity effect.'

Theoretical Introduction

Media artists have long been exploring the potentials and complexities of electronically mediated voice. From Yoko Ono screaming and coughing; to Alvin Lucier sitting and stuttering in his room; to Janet Cardiff leaving the room and the building to take us on sound walks; to Susan Philipsz with her locational singing – to name but a very few. Despite the richness of media art and the resounding way that sound studies burst into prominence in the 90s, vocal aesthetics has remained rather sub voce. And, although it has been several decades since Roland Barthes first invited attention with his concept of "grain of the voice," strangely, little general theoretical work on voice followed.

There was of course Derrida's significant work in the seventies, when he deconstructed the "self-presence, immediacy, identity, interiority" of vocal speech. [1] While this moved past invocations of voice as true, unmediated and authentic, the attention to vocal speech in relation to writing may well have played into a sort of binary, which inadvertently diverted theoretical attention. In recent years, however, critical writing has sidestepped such a binary, attending instead to an ambiguity of voice, a supplementarity, which resonate with Derridean concepts and draw out potentials of voice on which Derrida himself did not focus.

Key figures in this critical revival are Adriana Cavarero, Mladen Dolar, and Steven Connor, who share a sense of the complexity, the uncanniness, the difference and the paradox of voice. They recognise the in-between quality of voice – hinging between the physical (sonorous) and non-physical (signifying). [2] [3] As Steven Shaviro explains, in relation to Dolar's work: [4]

"Dolar... argues and demonstrates that the phenomenon of Voice is in fact far more uncanny and slippery, and already inclusive of difference, than Derrida gives it credit for. The voice always stands in between: in between body and language, in between biology and culture, in between inside and outside, in between subject and Other.... the voice is both what links these opposed categories together, what is common to both of them, without belonging to either." [5]

In its uncanniness – in Freud’s sense of *unheimlich* or *unhomely* – voice carries a trace of its ‘home,’ the body of the speaker, but leaves that home to perform speaking. Steven Connor is particularly intrigued by the uncanny voice of the double; he works with the *doppelgänger* figure of the ventriloquist’s speech because for him it evokes “the imaginary production of a secondary body, a body double: a ‘voice-body.’” [6] [7]

The doubling of voice undoes a ‘unitary’ subject – not just in relation to an individual subject, but it also disturbs a separation of two ‘unitary’ subjects. Here the work of Adriana Cavarero is particularly relevant, emphasizing the relationality of voice, in order, as she says, to prise apart any ‘unitary’ quality in Derrida’s figure of Speech. Cavarero engages with the alterity, relationality, and intersubjectivity of voice in order to get past the presence, which rightly, in her view, worried Derrida. [8] Relationality also resonates with the spatial relationship that voice creates, a shared space, a relational space, a doubled space – to which I’ll turn next.

Spatiality: Voice, Memory, and Place

While it’s a basic understanding within sound studies that sound operates not only through time but also in space – performatively in/forming the space it traverses – once again too little attention has been paid to how this plays out with voice in particular. Just as voice can be thought as a hinge between the sonorous and signifying, it also hinges between bodies and the spaces they inhabit: “...bend[ing] and connect[ing] rather than dividing.... facilitat[ing] openings and intertwinings (of doors, concepts, subjects, experiences, materials) rather than discriminating one side or one thing from another.” [9] And so voice hinges bodies and spaces, mediated and personal memory, memory and place; it connects speaking and listening bodies physically and affectively with each other as well as/through the spaces they share.

To explore this, I’ll discuss two works at Cockatoo Island, Sydney – a location resonant with its history as a prison and an industrial site and now an art and event site, tourist destination and camping ground. The first work is Susan Philipsz’ “The Internationale,” originally sited in an underpass in Ljubljana, during the 1999 European Biennial, Manifesta 3. The work was restaged in Cockatoo Island for the 2008 Biennale of Sydney (‘Revolutions - Forms that Turn’) in Turbine Hall – a large, abandoned post-industrial space. This is one of those works that takes you by surprise: What is the work? What is it doing here? Almost instantly, however, it seems completely sensible and at home. Yet, uncannily, of course, not at home, and thus disturbing our own location in the space. Philipsz’ singing of the classic workers’ anthem taps into the Hall’s physical memory, echoing through the space and through us. We feel ourselves differently in that space, sensing, somehow remembering its industrial history, as her frail, obviously recorded voice re-inhabits the space as if with workers’ memories – as if those memories haunt her voice, as if those memories haunt those enormous spaces, as if we overhear it in that space – a private, intimate voice wafting on that memory.

As always, Philipsz sings in a lone (lonely?), unaccompanied, palpably untrained voice – thin but reverberant. Here, it is an electronic voice emerging from one lone old speaker, calling you into the space as you approach. The effect of Philipsz’ recorded voice, evidently with little or no ‘art’ or ‘professional’ postproduction and no deployment of sophisticated speakers, is almost like an old radio abandoned somewhere in the Hall.

"When I make the recordings, it is important to keep the breaths and pauses in between, so that the song sounds natural and intimate. The idea is that when you hear a voice taken out of context in this way, your own sense of self becomes heightened while at the same time, you begin to experience your surroundings in a new way." [10]

For Philipsz this sort of production gives listeners the possibility to imagine it as their own voice. [11] For some it is a melancholy lament for revolutionary workers' hopes, for some it is exposed, fragile and brave, for still others, stirring and sad... Like any "cover" version, Philipsz is inhabited by and inhabits this song, bringing her own emotional response to it, but leaving us room to have our own.

Another, very different work – though like Philipsz', complex and ambiguous thanks to the voicing as well as being strangely in and out of place – is Richard Grayson's work, *Messiah*, in the 2010 Sydney Biennale. *Messiah* is located in one of Cockatoo Island's long tunnels – a transitional, hinging space, moving from the expansive and bright outside into a dark, intense, echoic domain. Off that tunnel, in a small low ceilinged dark room, plays Grayson's sound/video work.

Richard Grayson, who is interested in belief systems and the way that he sees Theology taking over from enlightenment rationalism, had emailed The Midnight Amblers, a group of musicians from Erskinville, Sydney, to rewrite and perform Handel's *Messiah* as country music – revoicing and rescoring it so that we could hear the words anew. He asked the band to perform the work in a back yard, recording it with various DIY video cameras. When Grayson edited in Berlin, the sync turned out to be a bit off. He embraced this 'failure,' which served well to "foreground the artifice," He wanted to "bring back the weirdness and the spookiness... of something we take in a way as granted." [12] In its room strewn bizarrely with classic country and western hay bales, the out-of-sync mode – where sound does not seamlessly sub-serve the visual – add to the disturbance and heightened sense of awareness of the materiality of each sense. Itself dislocated from concert hall to suburban back yard to funky Berlin and now to this 'art' space, Grayson's *Messiah* is dislocating – mediating and enhancing our sense of the layered memory of the work and of this place.

Performativity

In both of these works the voice is not just performing, it is performative – performatively bringing forth memory of the place in which we find ourselves. The concept of performativity helps to take us beyond voice as straightforward performance or as the emission from some fixed unitary subject. Performativity is suggestive of the way voices DO and create, the way they change something rather than present or represent. Recalling Cavarero's attention to the relationality of voice, I would suggest that voice performatively evokes this relationality, bringing it into being rather than expressing it. What I'd like to emphasize here is the complicated and intimate intersubjective relations, which are staged as performative electronic voices lure the other, across space, even across the familiar space of the Internet.

The example I'll present is the networked performance of visual artist Barbara Campbell. The title of her durational project, *1001 nights cast*, [13] played with the *Tales from 1001 Nights* (The Arabian Nights) and with the fact that the net cast of this performance involved a webcast and a cast of over two hundred writers, who submitted their stories online for Barbara to perform each night. When you logged on to her evening performance, you saw only her mouth, giving prominence to the voicing, which story-telling involves. Framed by a story of a bereft bride wandering the world and greeted by strangers who give her stories "to heal her heart," the webcast opened with a view of Barbara's tongue, pierced and

wounded—like the heart of the bride—with a numbered tongue stud that signaled the number of the day/performance. I was fascinated by that mouth and tongue—a bit like a Chinese acupuncturist, searching it for deeper meanings, to see what it told about her, as it told her/other's stories. I asked Campbell about the choice to frame her mouth and foreground her tongue, in a conversation we had for Maria Miranda's forthcoming book, *Unsightly Aesthetics*. We discussed the mouth as visceral evidence of the physicality of the storytelling, and the importance of voice.

"Barbara Campbell: Of course the other thing about my tongue was that it had the tongue stud in it which had the number of that night ... I previously didn't have any kind of piercing.... that was another kind of reminder to me that I was carrying the project around or that it was inhabiting me or I was inhabiting it because to have a piercing in your tongue is very much like carrying an open wound because the tongue with all those enzymes from the saliva is always trying to heal itself..." [14]

This pierced and wounded tongue not only performed the stories but also performatively brought forth an intimate and wounded affective space that inhabited us and that we inhabited together during the ephemeral nine minutes performance.

Modalities and Techniques of Voice

Technique is somewhat like performativity—it shapes the object and technologies to which it ostensibly responds. Elsewhere I have discussed a number of bodily techniques or habits that shape voices as well as various modes of voice that throw the normal voice into relief—from the broken and stuttering voice to the scream.* Here I'll focus on the 'ground zero' of voice, breath.

Breathing is both a technique that enables and shapes voice as well as a mode in the whispered or breathy voice. As an example, I'll reference my own collaborative artwork. For a number of years Maria Miranda, and I have been working on a project called *Talking about the Weather*. In this work, we've been collecting breath, beginning with performative encounters with strangers on the streets. The project was animated by a desire to get the world's biggest collection of breath and use it to blow back global warming.

As Tim Flannery said in a few poetic lines, which were the inspiration—literally and metaphorically—for this project, the intimacy of breath is not just between people but also between people and the planet:

"The air you just exhaled has already spread far and wide. The CO₂ from a breath last week may now be feeding a plant on a distant continent, or plankton in a frozen sea. In a matter of months all of the CO₂ you just exhaled will have dispersed around the planet." [15]

Breath is a particularly intimate and alluring mode of voice. Like full-throated voice, of which it is an essential condition and part, breath is compelling and intriguing in that it is both bodily and not—it starts in one body and then connects to and communicates with another. I should emphasize that I am not talking here about the commodified intimacy of TV ads that have become all too familiar. Rather the performative intimacy and breath that I am interested in and that I hear in a range of artists works, is more strange and in-between. It is a way of speaking about a shared affective, inter-corporeal space that is beyond that of two separate unitary subjectivities. Following Alfred North Whitehead's idea that "the body is only a peculiarly intimate bit of the world," cultural geographer Sarah Whatmore understands the way in which "the corporeality of the body and of the world fold through each other." [16]

Breath, in its affective movement, performatively calls forth the space around us – it is “the very engagement between body and world from which these feelings arise.” [17]

Returning to the streets where we collected breath... With the weather feeling so frightening when we started this work in 2006, we needed to talk about it – obsessively, incessantly – to connect with people through this talk. We were asking people to contribute the breath they would use to talk about the weather to our project. The project felt to us like a very intimate communication in that we were asking people to contribute something personal and vital. We asked first for a minute of their time and then for their breath. We were calling upon and calling forth their generosity – and doing it in the middle of their everyday life, going somewhere on the street or in the park – we were inviting strangers to enter an imaginative, performative zone with us.

As you can imagine, gathering the world’s largest collection of breath is a big task and we realized we needed to extend our search as widely as possible, so in 2008 we took it into Second Life. Not having played in such worlds as a gamer, my experience there was unexpected. While at first appearance, and certainly if you haven’t been “in world,” Second Life may look like a familiar cartoon world, but this fails to account for the strangely magical, compelling and intense feeling of being there, including an intimacy with avatars, one’s own, and others’. While preparing for the breath collection events, I wandered around Second Life and noticed its voice activation mode. However after one attempt, I quickly realised that I did not want to use it, because it actually broke the intimacy of the connections between me and my avatar and others’ avatars. That is, voice activation, my own voice and others’, took me out of the world. In a sense, this is obvious – the avatar has its own specific materiality and therefore needs its own voice. The implication of this is that in order not to break the intimacy of the Second Life experience, what is needed is either a silent voice, full of potential, but not actualised, or a particular voice for your avatar, that you choose or make, like all its other body parts and clothing. That voice would speak from the avatar’s ‘embodiment,’ not ‘yours’, and thus maintain the intimacy. Thus, in our own work in Second Life, which we experienced as a public place in which to collect breath, we chose to work with the specificity of avatars’ connections and still have the affect of voice by using only breath rather than spoken word.

Authenticity Effect

To end, I’ll briefly discuss what I call an ‘authenticity effect’ of voice. Although in the heyday of postmodernism and in the early days of the Internet, artists and everyday users seemed to revel in the disruption of identity and authenticity, now with social media and YouTube, there has been a prevalence of direct address and ‘at home’ videos that many read as a desire for and return to authenticity. What I sense in this, however, is a performative voice, and, as Cavarero would remind us, when voice works performatively, it is not necessarily a call to (or from) essentialism or authenticity. What we have here instead, I suggest, is voice performatively evoking authenticity – an authenticity effect.

Contemporary artist TV Moore provides my final example here. Timothy Vernon Moore delightfully invokes the network between subject and machine as he goes by his very own, proper name’s initials, TV – ‘no pun intended’, as he says. In his work, we can find stunning examples of what Nicolas Bourriaud insightfully understood as ‘postproduction’ (Postproduction, 2002) or what Mark Amerika inspiringly explores as remix culture (REMIXTHEBOOK 2011). After months of playing around in the Australian Broadcasting Corporations archives, TV Moore found a documentary about marginal people, earlier recog-

nised as 'vagrants' or hobos. In the 60s, they were a different sort of nonconformist or outsider or prototypical artist-- alienated youth outside 'normal' structures of work, family, home. What TV Moore did for the work "The Forgotten Man" (2006) was perform the script of all the people in the documentary, from the snooty bureaucrats to the youth themselves to the ABC narrator. He re-performed their words, lip-syncing with amazing closeness. And so you watch this video in wonder and wonderment... whose voice are you listening to, why do they all have the 'same' voice? Is it the same? The lip sync is so neat, so 'authentic' yet...

And then you wonder, what has become of these characters, now ventriloquized, haunted, inhabited by TV Moore – or is it he that is inhabited by them? 'Inhabiting' is one of the key ways that Bourriaud understands the working of Postproduction artists.

"Artists actively inhabit cultural and social forms.... By refilming a movie shot by shot, we represent something other than what was dealt with in the original work. We show the time that has passed, but above all we manifest a capacity to evolve among signs, to inhabit them." [18]

TV Moore voices an inhabiting of the forgotten man and all who discoursed around him, to mediate them and our memory of them, but also to displace them and himself. In this way, TV Moore's work not only provokes wonder – about the forgotten man, about history, about documentary and about authenticity – but also provides a stunning final example of the intimate, uncanny and paradoxical aesthetic potentials of voice.

Acknowledgments

I discuss a number of these ideas at length in "Introduction: The Paradox of Voice" and "Doing Things with Voices: Performativity and Voice" in *Voice: Vocal Aesthetics in Digital Arts and Media*, eds. Norie Neumark, Ross Gibson, and Theo van Leeuwen (Cambridge, MA: MIT Press, 2010).

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SKETCHES OF AN INTERDISCIPLINARY PRACTICE

Kim Newall & CHARLES WALKER

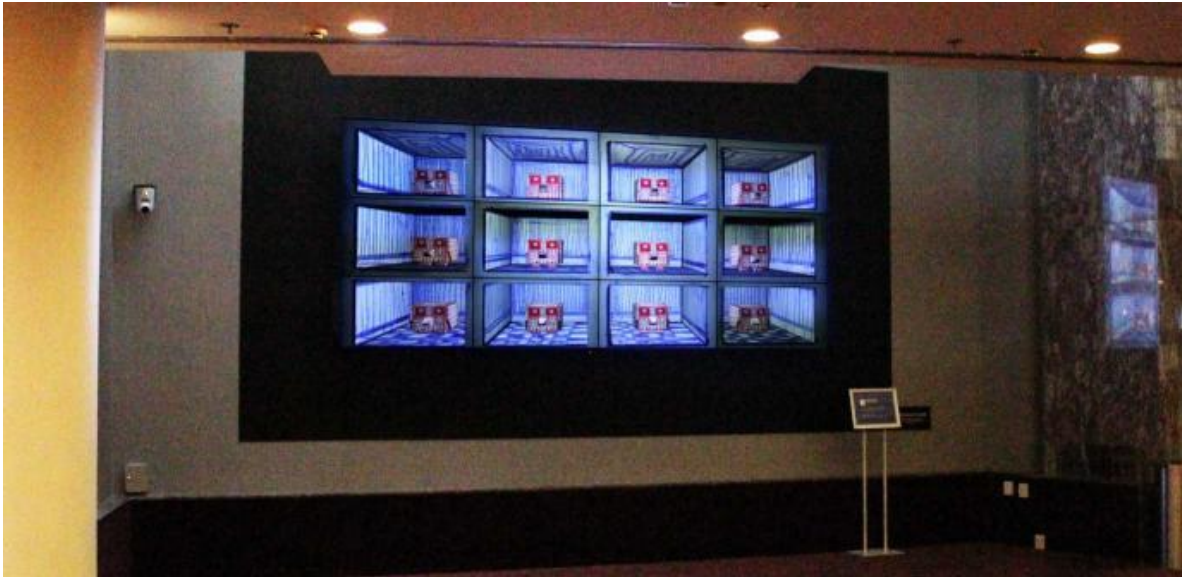


Fig 1. Kim Newall, "Roosting" (2011), interactive public installation, The Edge theatre, Auckland.

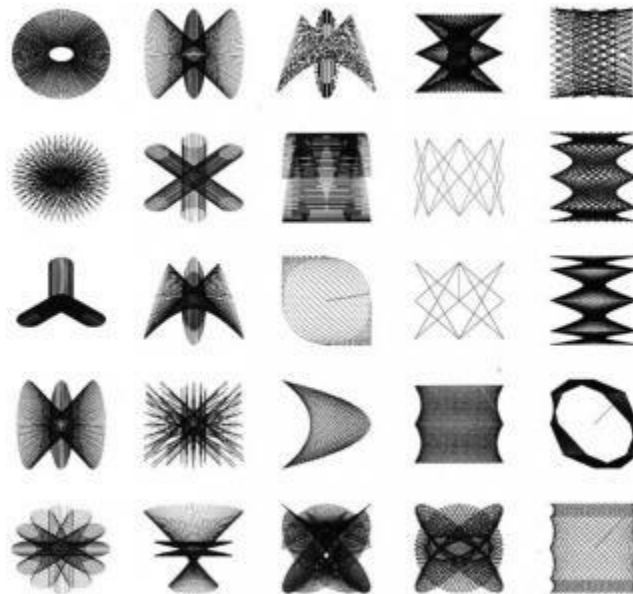


Fig 2. Kim Newall, "Circle Hacking", (1989).

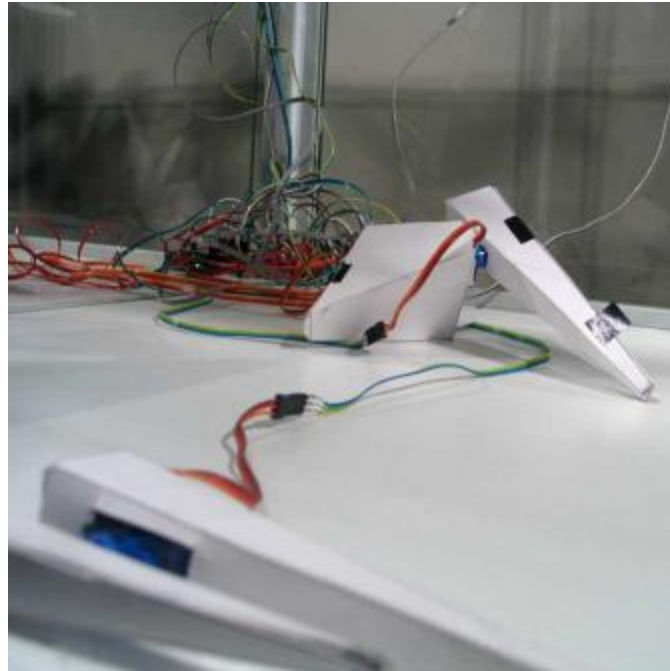


Fig 3. Kim Newall, "Evolutionary Experiments" (2010), interactive public installation, MIC gallery, Auckland.

Introduction

This paper by Kim Newall and Charles Walker presents part of a larger, practice-led research project to develop a new understanding of sketching as a methodology for creative practice in the post-digital age. It will be presented through a reflective critique of the researchers' own hybrid, interactive, public performance-based practice.

The presentation will explore the concept and nature of sketching as a methodology utilizing a variety of media and operating across normative disciplinary boundaries. The research involves defining notions of the sketch as it relates to historical and contemporary practices; speculative design, documentation and critique of methods for sketching in differing media, material formats and contexts, and; the critical conception, development, application, execution and performance of sketching in the context of the researcher's own creative practice. The work draws on recent research in mathematics, physical computing and cognitive science to suggest that sketching shares with these disciplines properties that can externalize cognitive processes or reveal categories of thinking. [1] [2] Through linking sound and video-based work, hacking, physical modeling and archival material with traditional drawing techniques, the presentation itself takes the form of a real-time, improvised sketch. The accumulation of such sketches (archived in "sketchbooks"), in turn, informs further conversations between differing modes of knowledge and expression.

Defining Sketching

Definitions and descriptions of sketching have remained relatively constant throughout history and have emphasized its “speedy, exploratory, spontaneous, abbreviated, unfinished, indeterminate, fiery, contingent and/or disordered qualities often characterized by loss of control or openness to the unexpected.” Frederik Stjernfelt notes that elements within modern art have can also be seen to have focused on certain features of the sketch, “to isolate them, cultivate them and see them as just as essential – or even more so – than the finished work of art.” [4] In design disciplines, sketching is commonly seen as an interim activity; making images to assist in the creation of something more real.

The sketch has also been widely understood as an interim stage in the design process in different disciplines. In design-based or visuo-spatial processes, such as architecture and product design, sketching is frequently defined as “the making of images used to assist ... in the design of something else.” [5] It is important to note here that, in such domains, the terms ‘drawing’ and ‘sketching’ can overlap in meaning and sometimes can be interchangeable. For example, Eames, suggests that “the thinking space that you move to during the working process is drawing.” [6]

Yet, while Eames suggests that “drawing provides an essential means of prodding and probing, doing and undoing, glimpsing and maybe seeing and experiencing reality and virtuality”, he also makes a distinction between the “high and low focus thinking” that drawing facilitates. [7] High focus relates to logical and analytical thinking. However, Eames low-focus thinking is characterized by “loss of control, creative fancy and the ability to be receptive to the unexpected or fantastic” – a description that suggests an activity that others would recognize as sketching.

Current reading has also highlighted how some of key concepts and practices of sketching have recently been adopted by or transferred to different media.

Deanna Petheridge, for example, notes that while sketches are often characterized by medium: “a musical, literary, a clay, or an oil paint”, other disciplines such as mathematics, philosophy and science have also appropriated the idea of the sketch. [8] In recent years sketching has also been of particular interest to cognitive psychology, in as much as mental states and sketching “share certain properties which are imprecise, ambiguous fluid, amorphous, indeterminate etc and can reveal the thought process or externalize the cognitive” thus linking looking and thinking. [9]

Others have also used the duality of internality (i.e. mental) or externality (i.e. physical) in studies of creative practices or processes. [10] Eames similarly sees the sketch as a way of externalizing the thinking process “... putting down an idea before it floats away – or materializing an idea.” [11] Bilda, Gero, & Purcell have suggested that, for the expert artist, ‘externalizing’ the idea may not be necessary and that the process happens internally. [12] Scientific studies on sketching (for example [13]) have compared differences between the EEG brain signals of trained and non-trained artists. Anderson & Helstrup have studied the effectiveness of mental imagery with and without drawing support (perceptual assistance) in the visual synthesis. [14]

For Simon Downs, such activity is a “two way process” that “oscillates between seeing, thinking, remembering and imagining, controlling and being controlled as the image emerges.” [15] This suggests that process and product may continuously and simultaneously shift in the course of making

Defining Creative Practice

A creative practice is defined by continual evolution and change. There are many ways that an established practice can be contextualized. Reflecting upon the practice reveals that there is a method that has been employed from the start and that this method can be defined as sketching.

In Newall's practice both real and traditional media defined as analog and digital media (including computers) have developed together. The process of digital has informed the process of the analog media. While originally seen as separate; over the years they are emerging into a new hybrid space. Sketching has played a pivotal role in the emergence of this space.

The traditional analog media employed include paper, card, pen paint, watercolour, tape. The digital media used include, computers, programming, microcontrollers, projection, video and electronics. Both these media domains however are constantly being augmented for different sketches to include music videos, video games, public interactive installations, VJing, live audio/visual shows, theatre shows, art gallery installations, and street art. Some of the above are formal finished works; others are works in progress that are always changing and are not seen as a piece of work. Often without a title they might happen spontaneously, in casual acts such as street art stickers.

Fundamentals

Some fundamental methods were established in the early period of the practice that still drive the current work. In the 1980s, with the advent of the microcomputer the availability of the computer at home for the non-professional provided the opportunity for anyone to experiment with computers and programming - in effect, to become a 'programmer'.

The low storage capabilities of Newall's first computers forced him to develop programming skills by working around limitation. Using what was available, with limited but evolving skills and knowledge, exploring the possibilities and gaining more knowledge and skills. In this process, Newall developed the capability we here call sketching, in which the sketch is a product or artifact in itself.

From following simple examples the practice developed to produce very simple programs that made simple drawings on green and black screens. When the computer was turned off the drawings were no longer there. They could only be reproduced from memory and in this process they did not always come out the same. These sketches were a set of commands or instructions that were executed in a linear fashion however having a visual, graphic outcome was very important. The simplicity and naivety of these 'sketches' became a defining characteristic of his practice and the basis of a new 'non-expert' expertise.

In the 1990s the Graphic User Interface (GUI) allowed computers to be used more efficiently by non-programmers. Examples of this commercial software include Adobe PhotoShop and Alias/Wavefront Maya. In recent years open source software, such as "Processing" and "Openframeworks" have again made programming accessible for creative and hobbyist enthusiasts, and has enabled programs to be sketchable.

A similar understanding of process has informed the design of a method of sketching to be explored with computer code. One result was *Processing*, a software program developed to encourage artists and designers to use computer programming as a means to create work (processing.org). The creators

of *Processing*, Ben Fry and Casey Reas, named the files that are created by the program, *sketches*, a clear signal that enabled artists and designers to relate to programming through techniques they were familiar with. The idea being that the computer program can be treated like a sketch; as something that is malleable and that can be pushed and pulled like clay, or drawn and erased like pencil. This notion that code can be put down as if by impulse, as a 'what if I do this?' kind of operation, suggests that the program does not need to be 'designed' top down, then 'executed' to perform a specific action or set of actions. Rather, programming can be used with a bottom-up approach, as tool for exploring or discovering, analogous to what happens in traditional forms of sketching.

Processing is a designed platform upon which the sketch may be made, performed or take place. It hides details that the sketcher does not need to know about. Technical requirements are minimal, so the non-technical user does not get stalled by having to deal with technology. The intention is to approximate the more familiar or 'natural' relationship of paper and pencil.

A similar concept - based on *Processing* and aimed at artists and designers rather than technical people - informs the *Arduino* platform - an open-source electronics prototyping system based on a few basic, flexible, easy-to-use components, including the microcontroller that can be programmed from an *Arduino* program language.

The tools that have been developed over the years that have allowed the non-expert access to technology, have enabled Newall to use these tools for sketching. Fostering an ability to try things out with fluency and intuition without being hindered by the complexity of technology.

Circle Hacking

Circle hacking is another example of digital sketching. It began by using an example in a computer manual on how to draw a circle in the middle of the screen. By changing the numbers in the equations to see what would result without knowing what was happening mathematically. The images were 'Spirograph' like drawings. The process of iteratively changing small bits of the code enabled the discovery of different, but related patterns.

This was the start of exploring what would happen if things were changed without a preset plan or idea. That hacking is one of the central ideas that has also lead into or applied to the traditional media. This was a fundamental way of thinking by beginning to change things to explore the possibilities with the media that was being used.

Graham describes his method "I tended to just spew out code that was hopelessly broken, and gradually beat it into shape" then he concludes "If I had only looked over at the other makers, the painters or the architects, I would have realized that there was a name for what I was doing: sketching." [14]

Hacking can be applied to any type of code or data with include different types of media and disciplines, Wark define hacking neatly in the following quote:

"Whatever code we hack, be it programming language, poetic language, math or music, curves or colourings, we create the possibility of new things entering the world. Not always great things, or even good things, but new things." [15]

This is one of the ways of summing up the creative practice described in this paper. Hacking is a process of bringing the intangible and the abstract into the real world as Wark explains

“To hack is to release the virtual into the actual, to express the difference of the real.” [16]

The process of hacking that was discovered in the hacking circles has been applied into the sketching with analog media. Changing/altering to find out what will happen. Hacking as a form of sketching applied to different media both analog and digital is key to Newall’s creative practice.

Sketch Books

The following section and visual presentation summarises Newall’s practice to the present time, highlighting some of the key concepts. A collection of sketches that included different media were developed in the early years, and now form the basis of current creative practice. A strong archival practice of maintaining sketchbooks also developed using traditional media or analog media such as pencil, ball-point pen, watercolour, etc., on paper. The sketchbooks evolved using digital printouts as starting points for further sketches and the digital and analog began to merge in new ways.

In the mid-nineties, Newall explored real-time 3D computer graphics that he began to label as ‘Sketches’ or ‘Drawings’. The idea of ‘performing’ came out of the act of manipulating these drawings; hours were spent exploring possibilities, often accompanied by responding to music in real time. A handful of videotapes were produced that he came to think of as an equivalent/alternative to sketchbooks of drawings. VJing was introduced to his practice at this time; this provided a way to perform live in front of any audience and could include projecting the mix of these videotapes in parallel,

The creative practice thus seeks to develop a conversation between different modes of artistic expression. He has come to realize that an original language is emerging from his search for further possibilities for interaction, mixing analog and digital together across virtual and real media, extending the “what if” question.

Animations and/from drawings, manipulated, come together as performance in the form of VJing; in turn, suggesting the performance itself as a form of sketch. Indeed, in the field of performance, the term ‘sketch’ and related ideas about ‘improvisation’ could be used to refer to a quality of sketching in terms of exploring the possible in real time.

Recent Work

The exploration of this relationship and a type of mixed reality that is ‘in-formation’ - always ‘in process’ and neither real nor virtual - has continued up to the present time. Examples include the interactive public projection work “Urban Life” (2009), the works for “Vending Machine” at Splore Festival (2010) where digital designs were sketched and materialized into real attachments for the human body and “Evolutionary Experiments” at MIC Gallery, Auckland (2010) where creatures developed from “Sketching” with software, hardware and cardboard, created and occupied a new space that would not have been possible in either digital or analog form.

The interactive work “Roosting” (2011) consisted of 12 birds on 12 TV screens in a 3x4 grid that reacted to movement in front of them. So how can sketching relate to the work? The answer is that the users

sketch with the work, not in the literal sense but in an abstract way. Some users would mimic the bird's booth with sound and movement on screen to see how the birds would react. This is exploration of what the work does, causing the user to improvise or sketch with the characters on screen. This opens up possibilities of how user interaction can be seen as sketching for future works

Conclusion

Many things are possible. There does not always need to be an outcome. The sketch enables technologies both analog and digital to merge. The sketch is not limited or restrained as a method. It is adaptable; it can operate at different levels and in different ways. Sketching can be done in any media with any technologies with many different outcomes. Sketching is an exploration of the possible, and can become a record of impossible. A sketch can exist in a moment of time and become an artefact. There is a time and place for the work to be what it needs to be: Sketch.

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THE HIDDEN HISTORIES OF OBJECTS: PROVENANCE, STORYTELLING AND TAGGING TECHNOLOGIES

Simone O'Callaghan & Chris Speed

As part of TOTeM, a £1.39M project based around the internet of things, this paper explores linking creative artefacts to stories of their inception, using QR codes.

Introduction

This paper explores storytelling methods to follow the lives of objects from their first inception to the narratives they collect along the way. It is part of TOTeM [\[1\]](#) a £1.39M research project based around the "Internet of Things" [\[2\]](#), which opens up new ways of preserving people's stories through linking objects to the Internet via "tagging" technologies such as QR codes.

The process of appending immaterial data such as textual, video and audio stories, offers a significant additional dimension to the material attributes of an object. Hand produced creative artefacts already transcend a material value because of their individual characteristics and their reference to social and cultural frameworks. As the emerging technology of the Internet of Things supports the tagging of more and more objects, things will begin to accrue an immaterial data shadow that will begin to outweigh its material instantiation (Sterling, 2005).

Project Partners at The University of Dundee and Edinburgh College of Art have been unpacking these notions through creative practices, working both as, and with artists to embed the Internet of Things in a more social and interpersonal context

A rolling stone DOES gather moss

In April 2010, the TOTeM project team launched the web project www.talesofthings. The site offered a simple but novel approach to recording social histories and a playful critique of the tagging culture that is associated with the emerging concept known as the 'Internet of Things'. Our platform allows anybody to attach web content (text, image, video and audio) to an artefact through the generation of a unique QR barcode that the owner is encouraged to stick to their thing. When scanned by somebody else using a smart phone, media is launched and the object can be seen/heard to tell a story about the memories that it is associated with.

Our reasoning was simple, that the existing public use of tags (RFID, traditional barcodes and two dimensional) is based upon a 'read only' relationship. And although the web savvy amongst us can generate a QR code and associate it with web-based media, for many people the scanning of codes is a practice reserved for people working on super market checkouts and in passport control booths. As well as offering a place in which unique codes are generated and allow stories to be associated with artefacts,

TalesofThings allows any other beholder the ability to 'add a tale' to someone else's 'thing'. By scanning a tag through the phone App, or by visiting the website, artefacts become 'writeable' and 'open' to further association. This is a critical dimension to the projects politics, that lessons learnt through Web 2.0 should be integral to any Internet of Things.

Following our launch last April the website began accruing stories that were associated with peoples actual material artefacts. However as the immaterial database grew it became clear that we needed an event that allowed the material artefacts to become an interface to our internet of things, rather than online repository of stories. RememberMe at Future Everything offered this context. The RememberMe artwork was a collaborative project with the Oxfam shop charity shop, in Manchester. During Future Everything 2010, a research assistant based in the shop, asked people who dropped things off to tell a brief story about one of the objects into a 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.

This material 'turn' in the life of the project readdressed the balance of where the immaterial data was located. Instead of being accessed through a web interface, the RememberMe work explored the potential of the TalesofThings project to manifest a social Internet of Things that is situated in the event based context of exchange. An exchange of things and stories that contests many of the habitual consumer practices that have formerly defined concepts of value, quality and the destiny of artefacts. A year later we wanted to exploit the projects 'write back' feature and see if we couldn't tip the balance between immaterial and material in favour of the former. During Future Everything 2011 the team developed a follow up project entitled RememberUs. The project consisted of two shops that acted as supernatural portals to the Internet of Things. Visitors to the Oxfam Emporium were invited to 'let go' of memories that are associated with particular things by attaching stories to our memory vessels, moments later in the Oxfam Originals shop just down the street, people were able to 'pick up' memories when they are associated with another 'thing' that they chose to buy. Upon leaving the shop, buyers found that the item that was 'new' to them was associated with a host of old memories, exploding the assumption that a rolling stone gathers no moss.

Artists Stories

When thinking about linking stories to objects, there always has to be a "first story", the one of how a thing came into being. The TOTeM project team is collaborating with creative practitioners to explore some of these first stories to establish platforms for provenance, where storytelling methods are examined for defining and capturing provenance. Looking back at the history of old objects, as well as forward to the possible futures of new objects it is also a means of providing legacies of provenance for future generations.

In tagging art, design & craft objects, the QR code acts as a “digital makers’ mark” with the potential to hold far richer data than traditional marks. Inspiration for the object’s creation and its maker become the key focus, rather than facts about production and manufacturing. Working in a similar way to social networking sites such as Flickr, users of TalesofThings can comment and build upon existing stories with the potential to create a crowd-sourced bank of knowledge about any individual object. This then has the potential to provide future generations with artworks, craft and design objects, which have integrity and a traceable heritage. Whilst the provenance captured by the data shadow of commercial things may be logistical: price, temperature, best before dates etc., information provided by artists and designers has the potential to provide significantly more evocative stories that may change entirely the perception of an object.

In 2005 YBA artist Simon Starling, won the Turner Prize for his work *Shedboatshed*. It appeared to be an ordinary shed and not particularly noteworthy. However, knowing that it was a shed found in rural Switzerland which Starling took apart, made into a boat, floated down the Rhine to the Kunstmuseum in Basel and then reconstructed back into a shed, has made the work, and winning of the Turner prize for it, objects of controversy in both the art world and mainstream media. Paul Shephard, a champion of Starling’s has said of the work: “One of the interesting things about this *Shedboatshed* is that the thing you’re looking at isn’t the whole work. Now this is always true in conceptual art generally because conceptual art uses its artwork to illustrate some other idea. I think what’s interesting about Simon’s work is that he doesn’t deal in concepts so much as actions - so the work is evidence of action having taken place which is slightly different.” (Shephard, 2005)

The idea that a particular action has taken place is pertinent to many objects, but we only know about these actions and the reason for something being identified as an art object if the artist tells us. With tools such as TalesofThings, there is a platform for makers to tell these stories, in an arena that facilitates the conveying and validating of peer reviewable truths. But these can also be subverted, allowing for fictions to be written and for myths arise, both about the objects and their makers. For how do we know that Starling really did float his *Shedboatshed* down the Rhine? The stories woven around creative artefacts also become a reflection of the persona or identities that a maker chooses to construct and portray in the context of their creative practice.

Such myth-making is not new but what is interesting is that by using tagging technologies that allow others to comment on an object’s stories, these myths can be exploited. Take for example, Andy Warhol, around whom myths have evolved. What does artwork made by Andy Warhol actually mean? His screen-prints are iconic, but, in contrast to the Congress of Artists’ definition of what constitutes an original print, Andy Warhol did not make original plates, work the stone, or in his case create even the original screens for his prints, yet he is still recognized as the artist. He did, however, add the “final touches” such as blotting lines to give a less mechanized feel in the final prints. This highlights that even an artist such as Andy Warhol recognized a need for something that resembled the touch of the artist’s hand, even to the point where works were signed. Through in true Warhol style, he was not the one to sign them, his mother was, and when she tired, another artist from The Factory took over. (Buskirk, 2003)

Imagine if those artists working in The Factory were able to tell the stories of the prints they worked on through tagging the artworks, and then allowing others to add to those stories. We can assume that many of those in The Factory were bound by loyalty to Warhol, but it would only take one disenchanted

person to open the floodgates. What would Valerie Solanas done have done with such capabilities in her hands? The myths of Warhol that we are familiar with today could have been very different.

Artist, Claire McVinnie, who like Any Warhol creates artworks using screen-printing, has been profiled in a collaboration with Dundee Contemporary Arts Print as part of a case study examining printmakers using QR codes as digital makers' marks. Over the space of 9 months, Claire has written about her works on TalesofThings, tagged and exhibited them with QR codes and has been filmed telling the tales of her works. Through these activities, the identity as an artist that she wishes to convey is being constructed for an audience who, quite often, may not share the same space and time zone that she does.

Tacitly, Claire is aware that there will be occasions where people will view her telling stories in a space that her works inhabit but that she does not. This is the phenomenon of tele-presence, defined by Lev Manovich as "representational technologies used to enable action, that is, to allow the viewer to manipulate reality through representation...the essence of telepresence is anti-presence" (Manovich, 2001). The art objects become signifiers of Claire's identity as an artist, whilst the digitally mediated content delivered to a users' mobile device can be seen as one way of confirming this in the absence of her actual physical presence. Such a validation can then affect the actions of those at the receiving end, for example the telling of her story may influence the purchase of one of her prints exhibited in a gallery, which may not have otherwise been purchased had the story not been told.

When discussing the filming of Claire's work and stories, she suggested that she be filmed at the print studio where there are screen-printing beds and the tools that she uses to make prints. She also has another studio where she preps her files and works on designs before actually creating the final pieces. The print studio is open-access, often noisy and full of bustle, whilst her own studio is a calm and quiet haven. In communicating her identity as an artist she chose to be filmed in the place where she has a more public image, rather than revealing her personal space on camera. This could be seen as her way of editing what is considered appropriate to convey as a professional artist, whilst remaining protective of a space that could reveal more of a more intimate aspect of her working life. Typical of artists in the print studio, Claire wears an apron, one of the many communal aprons that the artists here share, its stories smudged and smeared across it in a colourful splatter of dried ink. The ink is a testament to the numerous artefacts that the apron has witnessed coming into being and suggests a more experienced artist than if the apron were pristine and unmarked.

Through the use of digital media storytelling methods to construct a rich identity of the artist as a person, the stories can also illustrate the emotional investment of the maker in that creative artefact. In her screen-print of New York, Claire tells of how she went on a college trip there in 1995 and took photos from the Empire State Building, but was so disillusioned with the foggy weather she didn't bother to get them processed. Years later she found the film and did eventually process them, realizing that with photoshop she could claim back parts of the image that she had lost to the mist and rain. She also admits that "This is one of the first screen-prints I even did, so I was still just learning". It was also the first artwork that she chose to talk about when being filmed, which considering the strength of the image and the success she has had in selling it, suggests that the work is seminal in her journey as a professional artist.

Enhancing Aura

During the study of artists working at Dundee Contemporary Arts, the integrity of the artist as a print-maker is articulated through many of their stories and is poignant in Annis Fitzhugh's text-based entry on TalesofThings accompanied with an image of her work *Cancellation Proof*: "when a limited edition is completed, the plate or block is defaced, often with a cross, so that no more prints may be made from it. The plants represented are all on the Red List of endangered species." (Fitzhugh, 2010)

This entry implies that the edition is "authentic" because Annis created a cancellation print for her edition, a "proof" that the edition is limited. The content of the artwork, like the print itself, is endangered, rare and limited. Annis' entry also explains printmaking processes to non-printmakers and the comment following up on this by a user called "frogo" shows a discourse beginning to emerge about the work, and about printmaking practices, when they write: "That's sad that a lot of nice images get defaced in such a way :(" (ibid) One can infer that frogo is not a printmaker, but that they appreciate the print that was cancelled. This comment is also thought-provoking in how accepted norms and "good practices" in printmaking can be perceived as destructive by those outside the field, who are unaware of the critical debates surrounding authenticity and originality of the print.

By examining artefacts and the stories that creative practitioners use to express how their objects came into being, the frameworks in which they are viewed enables a privileged insight into maker's creative processes, experiences and emotional states. Through tagging technologies, this "mobile augmentation" of art and design objects, where the physical has digital and therefore multiple presences, Walter Benjamin's notion of "aura" comes into play, "One might generalize by saying: the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced." (Benjamin, 1934). In her study of Le Courbusier's archived drawings at the Le Fondation Le Corbusier in Paris, Susan Yee of MIT describes her experiences as she handles his largest drawings: "All I could think about was that this was Le Courbusier's original drawing. It was meticulously hand-drawn, but the drawing was dirty. There were marks on it, smudges, fingerprints, the marks of other hands, and now I added mine. I felt close to Le Courbusier..." (Lee, 2007). On her last day in Paris she discovers that all the drawings have been collated in a digital database and she mourns that "the scans for the website gave me nothing to touch" (ibid).

Benjamin's concepts come from experiencing the "original" work first hand, being able to see the marks that the artist has made in their exploration of the medium in which the work is created. The same applies for any object and the memories, bumps and scratches that it collects on its journey. Although the Internet of Things, and mobile tagging technologies demand a need for the digitisation of artefacts, one could argue that when an object is tagged with the previous owner's memories or a creative artefact is tagged and augmented with the artist's voice, the "aura" has the potential to be heightened and enhanced rather than lost.

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2. *This is tagging technologies to track physical objects in the real world. Eg: Oyster Cards in the London Underground.*

NETWORK MEDIA: EXPLORING THE SOCIOTECHNICAL RELATIONS BETWEEN MOBILE NETWORKS AND MEDIA PUBLICS

Rachel O'Dwyer

Considering 'media publics' as an assemblage of ICT networks, technological devices and human collectives, this paper explores the complex conditions across social and technical spheres that influence the character of contemporary media production, consumption and distribution on the go. Critiquing the current study of sociotechnical collectives it considers tactical media as one alternative approach.

Introduction

This paper concerns the sociotechnical relations between Mobile Information and Communication Technology (ICT) Networks and 'Media Publics', using a term to describe collaborative and non-proprietary practices emerging around the collectivised production, consumption and distribution of digitally networked media. In light of the ongoing integration of ICT networks into cultural practices, this paper calls for a critical theory of sociotechnical networks.

The following discussion critiques the epistemic frameworks available for the study of networked media, and in particular the intersection of technical and social apparatuses occurring around online culture. While the network as a cultural trope is prevalent in critical theory, the technical characteristics of network media (Infrastructure, topology, protocols and standards) are frequently 'black-boxed' in favour of overarching discussions of an immaterial network culture as it relates to broad frames of governance, subjectivity and political economy. By eliding a deep consideration of the material substrate of the network and subsequently the many ways in which media publics are generated in diverse relations between a range of actors, contemporary theory has failed to explore the complex ecologies of sociotechnical networks. Instead, in the literature of social media, we continually encounter linear causal models of analysis that all too easily equate centralised systems with proprietary cultures and decentralised networks with democratic media practices, failing to attend to the many nuanced ways in which the apparatuses of a communications network constrain or alternatively enable the formation of autonomous cultural collectives. If we really wish to explore the possibilities to design, implement and scale networks that support collaborative culture, we require a theoretical framework that traces agency through all layers of the network. Such a framework is still absent from network culture.

This theoretical gap will be illustrated with reference to an obviously sociotechnical assemblage, drawing on recent prototypes for episodic networks, a species of mobile ad hoc network that uses human proximity rather than fixed infrastructure to distribute data packets. Superficially these networks represent an ideal platform for the kinds of user-generated practices commonly associated with utopian accounts of media publics, suggesting a network topology that is fully distributed, supportive of peer-to-peer communications and dynamically self-organising. However, through an iterative analysis of the relations between different layers of the network, this paper explores how algorithms immanent to the substrate of the network expropriate user-generated content, monitor activity, shape future network behaviour and ultimately produce the network in ways that might advance proprietary interests and limit the agency of media publics.

This study demonstrates the need for appropriate frameworks and methods for research into networked media. While a number of approaches from technology studies and complexity are useful for the formation of a network media theory, this paper will conclude with a consideration of tactical art projects as one suitable approach.

Network Cultures

This discussion is situated within the disciplinary remit of 'network cultures' understanding new online media practices as endemic of a broader societal condition in which a distributed network topology supplants centralised and hierarchical models as the dominant cultural, social, political and economic organisational logic.

It is necessary, therefore, to begin with a brief disambiguation of the term 'network' as it is used within this paper. There are growing ambiguities around the term 'network' arising from its application across different disciplines: referencing a technical assemblage such as transport or electricity, or in the sociology of organisation, used to quantify institutions, markets and states, whereby the network represent an informal way of associating together human agents. In the context it is applied in this discussion, which draws from Manuel Castells onwards, the two meanings merge, since the 'network' becomes a privileged mode of organisation thanks to the very extension of Information and Communication Technologies. [1] A 'media public' therefore, as an assemblage formed around the production and distribution of online culture, is an example of one such network, including the producers and consumers of content, the content in question comprising text, voice or rich media, and the underlying technical assemblages which facilitates its transmission. This is comprised of contingent logical and physical strata; the higher level protocols and services implemented in software, and the lower substrate network, comprising tangible hardware such as user devices, transmission technologies and the available physical resources such as spectrum, bandwidth, real estate, man power and energy.

It is clear therefore that the 'media public' is a complex assemblage comprising not only human relationships but a whole range of logical and physical resources. These may be mutually supportive, but just as often they are structurally contradistinctive or otherwise opposed. Where the media public as a progenitor of a rich online culture is contingent on technical infrastructure, our analysis should also proceed towards the complex and iterative relations between network layers, in particular the mutual enforcements or structural antagonisms that might alternatively constrain or enable the emergence of an autonomous cultural collective.

Media Publics

Common terms for media publics such as Howard Rheingold's 'Smart Mobs', Mimi Sheller's 'Mobile Publics' and Kazys Varnelis 'Networked Public' model all converge on the idea that recent technological transformations inherent to ICT architectures herald a correspondent shift in the collaborative media practices developing over these. [2] [3] [4] The 'media public' emerges as a counter-capitalist ideology whereby technical affordances in the network are thought to disintermediate controlling interests and facilitate an autonomous networked information economy. [5] These affordances include a consumer electronics culture that places the means of immaterial production in the hands of a majority, the primacy of distributed topologies and non-discriminatory protocols over traditional centralised communications, and a consequential shift from the audience as passive consumer, towards the ambiguous subjectivity of the 'produser' as an active agent in non-proprietary culture. [6] These broad transformations

are in turn associated with peer-to-peer economies, an inherently democratic mode of governance, an invigoration of the public sphere, and the emergence of an online collaborative culture sustained through voluntary production over the network.

With the emergence of Web 2.0 platforms that emphasise collaborative production and content-centric architectures, and the subsequent progression of these activities beyond the desktop to mobile and pervasive contexts, the advocates of online collaborative culture identify a relative increase in the role of nonmarket practices taking place around the collective exchange of mobile information, knowledge and culture. These include frameworks such as Open Source, User-Generated content, DIY Production and Grass Roots Media. These theorists see the immaterial culture of the media public progressing outwards into hybrid space, as an online culture that has potential social, juridical and economic implications for real world cultures and material economies. Mobile networks are a space in which this intersection is thought to be particularly prevalent, representing a point of intersection between virtual and physical practices.

This paper identifies certain issues with the theoretical frameworks that underpin the dominant ideology of media publics. These are based on two interrelated criticisms:

The first claims that cultural studies of online media publics avoid a full consideration of the technological infrastructure underpinning online culture. While ICT technology is the necessary precondition for a networked public, its physical concatenations are again and again rendered immaterial in favour of the generalised tropes of links, webs and globalised interconnectivity. Network cultures frequently fail to take into consideration the politics of the material substrate, its counter purposes, proprietary origins and deep structural organisation, promoting instead a benign equivalence between superficial traits of the technical architecture and modes of autonomist social organisation. Too often the technical system is taken at face value and its agency is not fully explored.

Tensions frequently emerge between an online culture based on voluntary production and loosely woven collaboration and the organisational and economic logics of the material systems that underpin these media publics, such that a non-proprietary culture at a content layer might be subsumed, expropriated or otherwise conflicted by proprietary or controlling interests underpinning the network. An example of this can be gleaned from a consideration of current mobile networks. On the one hand, the distribution of networking capabilities within everyday spaces and contexts is frequently associated with new forms of collaboration, political economy and public activism. At the same time, it is increasingly clear that these networks are also aligned with new economic frameworks and powerful forms of governance that thrive on decentralisation, monitoring behaviours, extracting surplus value from user-generated content and otherwise surveying, exhausting and constraining online cultural activities. The reality is not a dialectic in which dominant or subaltern forces are externally located. Proprietary and non-proprietary, liberatory and controlling agencies are endogenous to the network, and frequently operate in symbiosis, producing complex and emergent behaviours.

Which brings us to our second criticism, namely an identification of alternatively social or technologically deterministic analyses in the literature on media publics. Research in social media continues to employ linear-causal models of analysis that all too easily equate centralised communication technologies with proprietary frameworks and the distributed topologies of communication networks with inherently democratic media practices, failing to attend to the many ways in which collaborative online culture is generated in diverse relations between human and non-human actors. Even as the research pays lip service

to the language of complexity or critical reflexivity, studies fail to account for the dynamic and iterative qualities of sociotechnical networks.

Episodic Networks

The complexity of the mobile publics can be illustrated with reference to an obviously sociotechnical assemblage: forms of mobile ad-hoc, and delay tolerant networks that are often termed episodic, opportunistic or pocket-switched networks. 'Episodic' describes a network whose topology is constantly performed and negotiated through pair-wise connectivity between mobile devices. Unlike the majority of networks that rely on relatively stable material infrastructure in the form of fibre-optics, cables, base stations and routers etc., episodic networks are by definition contingent, their elements dynamically re-configuring based on necessity and circumstance. Episodic networks route data through a network of mobile peers. Each peer (human) forms a node within the network, transferring data from device to device without the aid of a centralising relay structure. Nested in human interaction, the concept of the 'people as network' is increasingly resonant. These networks utilise everyday patterns of mobility and varied and sporadic forms of connectivity between strangers and familiars in dense environments to leverage a dynamic network topology for the distribution of media content. The value of the system is correlative with the user's social connection to others in a networked space. In principle they facilitate the production of self-organising groups, bypassing the hierarchical structure of traditional mobile communications to form peer-to-peer reconfigurable communications with individuals in proximity to a user.

The episodic network is discussed here more for its heuristic value than its relevance to current network architecture. However, there is evidence of the increased relevance of such topologies in future mobile networks, with 4G and LTE supporting various mesh-like topologies that resemble ad hoc modes of connectivity. Initially theorised in the 1970s as an emergency service and valorised in the early noughties, they are increasingly discussed as a viable component of future mobile media architectures. Principally designs for episodic networks concerned the exchange of text-based files or operational instructions for proximate devices in a user's environment, but more recently following the exponential growth of content-centric activities on mobile and wireless networks, the episodic network has re-emerged as a potential strategy for the dynamic exchange of rich media content in real spaces and a form of data-offloading for increasingly congested wireless network spaces.

Undersound is a proposal for music exchange on the London Underground. [7] It utilises an episodic network topology within the transport system itself for the opportunistic exchange of audio files. These files are associated with static terminals in train stations throughout the city. Users can upload and download tracks at these centralised points and exchange them using software on mobile internet devices such as a phone. Users on the tube can browse each other's playlists in transit and choose to share and distribute music between devices. The system also includes algorithms for monitoring media consumption/distribution patterns and the propagation of files throughout the network. When a user re-connects to an upload point at a station, therefore, metadata concerning file exchanges and relational patterns are also automatically uploaded to the network and subsequently used to model sociality and media-exchange occurring within the underground. The designers of Undersound theorise this data as informative to the future design of social media networks that utilise context-aware information to enable file transfers and opportunistic sharing. [8]

At first glance these networks are every promising architectures for the kinds of user-generated practices that are typically associated with optimistic accounts of media publics. It can be argued that the distributed topology of the network and the nesting of technical agency in everyday environments leverages a public brought together around the dynamic exchange of information and rich media content. But such an easy analysis fails to account for the complex characteristics of the network that emerge through the relations between the social and the technical. Through an iterative analysis of the episodic network, we can explore how social behaviours and everyday habits are aggregated by proprietary devices and platforms and subsequently utilised: as valuable metadata for proprietary interests, as dynamic information that informs decisions at the logical layer of the network, and as quantitative research that informs the design of future network architectures.

A large amount of information can be gleaned from episodic networks. These include a whole range of user-generated content both consciously and unconsciously produced from demographic, geographic, social and even biometric data. In terms of social network analysis, information about everyday sociality; who we come into contact with and for how long, what value we, as individuals, offer as a node in the network and broad mobility dynamics concerning our movement as a group are all important data for determining the reconfigurable topology and routing protocols implemented by the network, its efficiency, and overall performance. Secondly, meta-data collected through often deeply embedded processes running on proprietary devices or fixed points of infrastructure are lucrative forms of user-generated content. Just as this data forms the economic base of fixed internet conglomerates such as Facebook and Google, this mobile data is associated with a significant market value, further leveraged by context and geo-spatial data provided by a mobile network. Mobile episodic networks therefore provide ideal platforms for the expropriation of contextual metadata that can be sold to external corporations looking to enhance, rationalise and personalise marketing and advertising,

This raises some questions: How do these systems quantify human sociality as inherently productive of valuable? What kinds of collaboration or sociality are subsequently encouraged or normalised? How is the production of user-generated content on such a network used to advance the interests of corporations, expropriate the value of creative practices and ultimately constrain the formation of an autonomous culture?

The situation we witness therefore is not only the creation of new social practices, but furthermore, the controlling, monitoring and expropriation of these through mechanisms facilitated by the architecture of the network itself.

Conclusion

In the highly mediated spaces of online culture, it's clear that we require a critical awareness of the sociotechnical geographies of enablement and constraint operating across all layers of the network. The previous illustration still only gestures towards this complexity. We require approaches that can move across methods and trans disciplines traditionally aligned with the humanities or the sciences and appropriate complex, emergent behaviours.

While a number of approaches from the Philosophy of Science and the Science of Complexity provide useful starting points, the previous discussion points toward the need for practical methods that are themselves immanent to the network. Described as an intermediary between artistic and ethico-political activism, tactical media provides a frame from which to categorise a variety of extra-curricular methods

through which a sociotechnical system might be made visible. These include practices such as the tracing or mapping of connections, the fictionalisation, inversion or reflexive exploration of networks, and the misuse, recontextualisation, exploit, or abstraction of economic, social and political processes through technological media.

Umbrella.net for example is an episodic prototype developed by a team of artists working in the Network and Telecommunications Research Group in Trinity College Dublin[9]. The work in question comprises a coincident network in which everyday items, in this case an umbrella, activate an ad hoc network when they are deployed in public. The network itself, from a commercial perspective, can be theorised as a solution without a problem, (why would you need a network only when its raining?) but from a heuristic perspective it allows a user to trace the layers of contingency between social circumstances, and pervasive technologies, to expand forms of assembly and ultimately make mediators of constituents that would otherwise be intermediaries. While it is beyond the scope of this short paper to explore the spectrum of relevant work in detail, the reader is referred to a number of tactical media practices useful to the study of mobile publics such as work across Locative Media, 'Hactivism', forms of data sonification and data visualisation, and critical Net-Art. These propose oblique ways of critiquing, imagining and dissembling the mobile public in the character of the techniques and apparatuses that came to structure it.

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